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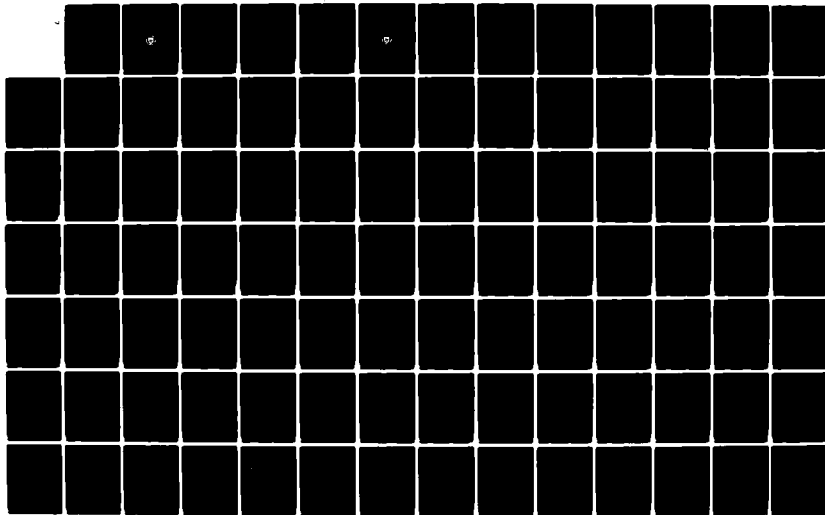
US ARMY REGIMENTAL PERSONNEL ALLOCATION STUDY (REPAST)
(U) ARMY CONCEPTS ANALYSIS AGENCY BETHESDA MD W L CARR
FEB 84 CAA-SR-84-8

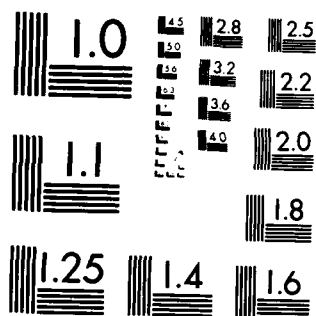
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STUDY REPORT
CAA-SR-84-8

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US ARMY REGIMENTAL PERSONNEL ALLOCATION STUDY (REPAST)

FEBRUARY 1984



PREPARED BY
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20. ABSTRACT (Continue on reverse side if necessary and identify by block number) The REPAST Study is to assist HQDA in the development of a regimental system for cavalry units. The assignment of armor battalions and cavalry squadrons to regiments resulted in unequal career opportunities for soldiers serving in different regiments. CMF 19 positions in organizations other than the regimental units were not affiliated with any regiment. Using a sequential linear goal programing model the study distributed the extraregimental MOS 19E and 19K positions among the regiments to equalize individual career opportunities.		

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DEPARTMENT OF THE ARMY
US ARMY CONCEPTS ANALYSIS AGENCY
8120 WOODMONT AVENUE
BETHESDA, MARYLAND 20814

20 APR 1984

CSCA-FSP

SUBJECT: US Army Regimental Personnel Allocation Study (REPAST)

Deputy Chief of Staff for
Operations and Plans
Department of the Army
ATTN: DAMO-ODO
Washington, DC 20310

1. Reference.
 - a. Letter, DAMO-ODO, HQDA, dated 25 August 1983, subject as above.
 - b. Letter, CSCA-FSP, USACAA, dated 21 December 1983, subject as above.
2. In August 1983, CAA was tasked by your office to conduct REPAST. In December the study was modified to focus on only Armor Regiments.
3. Attached is the final study report which fulfills the requirements set forth in references a and b above.

David C. Hardison

1 Incl
as

DAVID C. HARDISON
Director



US ARMY REGIMENTAL
PERSONNEL ALLOCATION STUDY
(REPAST)

ONE SHEET
STUDY GIST
CAA-SR-84-8

THE PRINCIPAL FINDINGS of the work reported herein are as follows:

- (1) The proposed armor regimental structure which provides the best balance between CONUS and OCONUS elements of each regiment also provides the most equal career opportunities for MOS 19E and 19K.
- (2) Unit flow requirements constrain so many of the MOS 19E and 19K extraregimental positions that only limited equalization of career opportunities in disadvantaged regiments is possible.
- (3) Affiliating component units of a regiment with other regiments alters the career opportunities of soldiers serving in the regiment from the opportunities afforded to individuals in a similar undivided regiment.
- (4) If MOS 19E and 19K are not considered compatible and substitutable, the maximum number of companies which may cycle overseas is reduced from 176 to 136.

THE MAIN ASSUMPTIONS on which the work reported herein rests are as follows:

- (1) The authorization data provided by the proponent is accurate. The Army will be manned to that authorization.
- (2) The system is operating in a steady-state peacetime condition and will not be subject to major dislocations such as restationing of units and unit activations, deactivations, and conversions.
- (3) MOS 19E and 19K are compatible and substitutable.
- (4) Equal time in CONUS between overseas tours, equal promotion opportunity, and the best possible assignment locations are the most important individual career characteristics in that order.

THE PRINCIPAL LIMITATIONS of this work which may affect the findings are as follows:

- (1) The study did not address questions concerning the effect of the regimental and unit replacement system on the cohesion, readiness, or capability of the units involved.

(2) Only MOS 19E and 19K were considered; questions concerning other combat, combat support, and combat service support personnel were not addressed.

(3) The methodology employed was deterministic and ignored many manning functions and interactions. For example, transitions between primary and secondary MOSs were not considered.

THE SCOPE OF THE STUDY is an analysis of selected individual career characteristics that would result for soldiers serving in any of the proposed tank or cavalry regiments. All armor regiments are included in the analysis because CMF 19 spaces are authorized in tank as well as cavalry units.

THE STUDY OBJECTIVES were to:

(1) Analyze various alternatives for cavalry regiments to determine the proposal which minimizes the deviation between regiments in turnaround time, promotion opportunity, and geographic location.

(2) Determine the allocation of CMF 19 (MOSs 19E and 19K) spaces for each cavalry regiment by grade and MOS.

THE BASIC APPROACH followed in this study was to distribute extraregimental personnel spaces to proposed regiments to minimize the deviation between regiments in turnaround time, promotion opportunity, and location. A sequential linear goal programming model was used for this effort. The achievement function values obtained for each set of regimental proposals were then compared to determine the best proposal.

THE REASON FOR PERFORMING THE STUDY was to assist the Office of the Deputy Chief of Staff for Operations and Plans in the development and implementation of a regimental system for cavalry units.

THE STUDY SPONSOR was the Office of the Deputy Chief of Staff for Operations and Plans (ODCSOPS).

THE STUDY EFFORT was directed by MAJ William L. Carr, Force Systems Directorate.

COMMENTS AND QUESTIONS may be directed to the US Army Concepts Analysis Agency, ATTN: Assistant Director for Force Systems (CSCA-FS), 8120 Woodmont Avenue, Bethesda, MD 20814.

Tear-out copies of this synopsis are at back cover.

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US ARMY REGIMENTAL PERSONNEL ALLOCATION STUDY (REPAST)

CHAPTER 1

INTRODUCTION

1-1. STUDY PURPOSE. The US Army Regimental Personnel Allocation Study (REPAST) was initiated to assist the Office of the Deputy Chief of Staff for Operations and Plans (ODCSOPS) in the development and implementation of a regimental system for cavalry units.

1-2. DEFINITIONS. To ensure adequate understanding of the terminology and concepts presented in this report, several key definitions are presented below:

a. Career Opportunities. Those circumstances, experienced during successive assignments, which affect the retention and advancement of soldiers in the Army. For the purposes of this study, the opportunities which are considered most important, and their relative priority, are described as goals in paragraph 1-3c below.

b. Affiliation. The close and continuous association or identification of a soldier with a single regiment or institution throughout his career.

c. Extraregimental Assignment (ERA) Spaces. Authorized spaces in organizations which are not assigned to regiments. ERA spaces include TDA and TOE spaces above battalion level.

d. Regimental Homebase. The installation at which one or more of the battalions of a regiment are stationed. The home of the regimental colors and memorabilia.

e. One-theater Deployment Pattern. A descriptor for a regiment whose units are stationed in CONUS and in only one OCONUS theater. The OCONUS theater may be either a long-tour or a short-tour area.

f. Two-theater Deployment Pattern. A descriptor for a regiment whose units are stationed in CONUS and in more than one OCONUS theater. In this study all two-theater regiments have units stationed in one long-tour and one short-tour theater.

g. Balanced

(1) One-theater, long-tour regiments are balanced if they have equal numbers of units in both CONUS and OCONUS.

(2) One-theater, short-tour regiments are balanced if they have a ratio of CONUS to OCONUS units of 2 to 1.

(3) Two-theater regiments are balanced if they are balanced for each of their theaters individually.

h. CONUS Heavy. A regiment is CONUS heavy if it is not balanced and its ratio of CONUS to OCONUS units is greater than its balanced ratio.

i. CONUS Light. A regiment is CONUS light if it is not balanced and its ratio of CONUS to OCONUS units is less than its balanced ratio.

1-3. BACKGROUND

a. ODCSOPS assigns units to regiments following consideration of many pertinent factors. Once assigned, CONUS and OCONUS units within each regiment are linked together to permit unit movement. The resultant regimental structures and the geographic location of the authorized positions shape career opportunities for soldiers of the same MOS serving in that system. Previous analyses of initial infantry, armor, and field artillery regiments indicated wide variation in opportunities for soldiers affiliated with different regiments.

b. Analysis also indicated that the career opportunities of soldiers serving only in extraregimental assignment (ERA) spaces would be better than those of regimental soldiers. Soldiers serving in both types of positions would have career patterns somewhere between an exclusively ERA or regimental pattern. The specific pattern would depend on the time spent in each type assignment. Judicious distribution of these ERA spaces among regiments could provide soldiers in the same MOS similar career opportunities regardless of regimental affiliation. Theoretically, all regimental patterns could be made to match that of the MOS as a whole. The degree of success achieved depends on the number of ERA resources available in each geographic location.

c. The Unit Replacement System Analysis III (URSA III) Study was conducted in 1983 to minimize the variation in key career opportunities of infantry, armor and field artillery soldiers with the same MOS but different regiments. Six goals were selected with priorities shown in Table 1-1. The ERA spaces were used as resources to optimize each goal in priority sequence. If ERA spaces were affiliated with each regiment as calculated by the Allocation Model (see paragraph 2-4), career opportunities would be as similar as possible for soldiers of the same MOS given the study's assumptions and the constraints imposed by proposed unit and personnel policies.

Table 1-1. Allocation Goals

Goal	Priority
Individuals have same CONUS turnaround time	1
Individuals have same promotion opportunity	2
Best geographic distribution	3
Equal chance to have unit assignment	4
Equal chance of short-tour assignment	5
Equal size regiments	6

d. In June 1983 the Chief of Staff, US Army (CSA), approved regimental structures for infantry, armor, and field artillery with the exception of cavalry regiments. He directed additional staffing to improve the career opportunities of cavalry soldiers. Since cavalry regiments are a part of the armor regimental system, reexamination of all armor regiments was required. (NOTE: The regimental titles are confusing. A regiment which contains only tank battalions is designated as an armor regiment. A regiment designated as a cavalry regiment may contain a variety of units: infantry, tank, or cavalry. In this study regiments will be designated either armor (tank units) or cavalry.)

1-4. **THE PROBLEM.** A structure is needed for cavalry regiments that allows soldiers of the same MOS serving in any armor or cavalry regiment similar career opportunities.

1-5. OBJECTIVES

a. Using the model developed for URSA III, analyze various alternatives for cavalry regiments to determine the proposal which minimizes the deviation between regiments in turnaround time, promotion opportunity, and geographic location.

b. Determine the allocation of CMF 19 (MOSs 19E and 19K) spaces for each cavalry regiment by grade and MOS.

1-6. SCOPE

a. Tank and cavalry units will be considered.

b. Enlisted personnel authorizations in CMF 19 will be considered.

c. Personnel authorization documents for FY 87 will be used. No increase in personnel authorizations will be permitted.

- d. Airborne, Ranger, and Special Forces authorizations will not be considered.
- e. Regiments will be designated by ODCSOPS.
- f. Only a peacetime, steady-state operation will be considered.
- g. The unit long-tour cycle will consist of 18 months in CONUS followed by 18 months OCONUS.
- h. The unit short-tour cycle will consist of 24 months in CONUS followed by 12 months OCONUS.
- i. Homebasing requirements for designated regiments will be considered. Site specific data will be used.
- j. URSA III methodology will be used to allocate personnel spaces.

1-7. LIMITATIONS

- a. The study did not address questions concerning the effect of the regimental and unit replacement system on the cohesion, readiness, or capability of the units involved.
- b. Only MOS 19E and 19K were considered; questions concerning other combat, combat support, and combat service support personnel were not addressed.
- c. The methodology employed was deterministic and ignored many manning functions and interactions. For example, transitions between primary and secondary MOSs were not considered.

1-8. ASSUMPTIONS

- a. Worldwide deployment of units for FY 86 and beyond will be fixed.
- b. The proposed alternative regimental structures will contain the same set of units as the ODCSOPS base case structure.
- c. The proposed alternative regimental structures will meet or exceed the unit movement capability of the ODCSOPS base case structure.

1-9. QUESTIONS TO BE ANSWERED BY THE ANALYSIS

- a. Which alternative regimental structure provides the least deviation in turnaround time, promotion opportunity, and geographic location?
- b. What should the personnel authorizations be for each regiment by grade and MOS?

1-10. CONTENTS OF THE REPORT. The subsequent chapters, supported by appendices, present the study results. Chapter 2 contains a general description of the methodology; Chapter 3 presents study results which are keyed to the study questions; and Chapter 4 consists of observations not directly related to study questions. Appendix C provides an overview of the Allocation Model; Appendix D contains a listing of each regimental structure analyzed and a brief discussion of the development of each; and Appendix E contains a sample of the allocation reports which were provided to the study sponsor.

CHAPTER 2

METHODOLOGY

Section I. STUDY METHODOLOGY

2-1. INTRODUCTION. The purpose of this chapter is to provide a general description of the methodology used in REPAST. Section I outlines the overall study methodology while Section II focuses on the Allocation Model and the degree to which stated goals were satisfied by the model.

2-2. PROBLEM

a. The ODCSOPS actions of linking and pairing established the basic structure of each regiment and fixed each regiment's personnel authorization; that is, the number of TOE positions in the component battalions. This action did not, however, distribute any of the ERA spaces.

b. The problem, then, was to distribute the ERA spaces to regiments so as to minimize the differences which would be experienced by soldiers of the same grade and MOS who were affiliated with different regiments.

2-3. APPROACH

a. **General.** The study methodology and analytical tools used in this study were developed for the Unit Replacement System Analysis III Study (URSA III) conducted by this Agency and published in June 1983 (CAA-SR-83-9). A sequential linear goal programming model (the Allocation Model) was used to allocate the available ERA spaces to regiments. (NOTE: Appendix C presents an overview of the Allocation Model.) In using this approach, the goals enumerated in Table 1-1 were formulated as achievement functions which typically consisted of a set of deviation variables, the sum of which was to be minimized. The comparison of regimental structure alternatives was accomplished for each goal by examining the differences between the achievement function values of the various alternatives.

b. Study Methodology

(1) **General.** The primary tasks associated with the conduct of this study included: collection and preparation of input data, validation of the MOS upon which allocation would be based, analysis of alternatives, and the preparation of the study report.

(2) **Data.** The Allocation Model requires input data of two types: policy data and authorization data. Policy data describes the regimental structure under consideration. It includes the number of battalions/-squadrons in each regiment, the specific identification of each unit, and the location of each regiment's homebase. The authorization data file is a listing of all PERSACS (Personnel Structure and Composition System) authorized spaces as of 30 September 1986 as edited by the study sponsor.

(3) Critical MOS

(a) CMF 19 consists, for the purposes of this study, of four MOS: 19D (scouts), 19E (M60 tankers), 19K (M1 tankers), and 19Z (E-8s). The regimental structure which provides the most similar career opportunity for persons serving in any one of these MOS may not be the structure which provides the most equitable career opportunity for persons in any of the other MOSs. For this reason it was necessary to identify that MOS for which the provision of similar career opportunities would be most difficult. This MOS was called the critical MOS.

(b) The degree of success achieved in providing similar career opportunities within a specific MOS is dependent upon the number of ERA spaces in that MOS available for allocation to the various regiments. The greater the ratio of ERA to unit spaces the greater the ability of the Allocation Model to influence the career patterns of individuals within a given regimental structure. Thus the MOS with the lowest ratio of ERA to unit spaces would be the most difficult for which to provide similar career opportunities.

(c) Table 2-1 compares the number of ERA and unit spaces authorized for each MOS. M60 and M1 tankers were considered interchangeable for the analysis and hence were described as MOS 19E/K. From the information in Table 2-1, MOS 19E/K was identified as the critical MOS and thus became the basis on which the analysis of alternative regimental structures was conducted.

Table 2-1. Space Comparison

MOS	Type	ERA Spaces	Unit Spaces
19D	Scouts	4,618	4,552
19E/K	M60 + M1 tankers	2,536	13,817
19Z	E-8	290	480

(4) Analysis

(a) Two regimental structures, identified as the Base Case and Alternative 1, were initially designated by ODCSOPS for analysis. Each of these structures consisted of 17 distinct regiments. The characteristics of these structures are illustrated in Table 2-2.

Table 2-2. Initial Regimental Structures

Alternative	One-theater deployment			Two-theater deployment
	Balanced	CONUS heavy	CONUS light	
Base Case	10	3	2	2
1	12	1	2	2

(b) Policy and critical MOS authorization data files for these alternatives were prepared and input to the Allocation Model. Comparison of output indicated potential for improvement in the achievement of turnaround time and promotion goals by further increasing the number of balanced regiments in the structure.

(c) Three additional regimental structures, identified as Alternatives 2, 3, and 4, were subsequently developed. These structures were created by the redesignation of linked units within the original 17 regiments and were approved by ODCSOPS for analysis. All two-theater deployment patterns were eliminated, and each new alternative had a total of 14 balanced regiments, one CONUS heavy regiment, and two CONUS light regiments.

(d) As expected, the balancing of regiments in Alternatives 2 through 4 resulted in each of these structures providing significant improvements over the original alternatives in both the turnaround time and promotion goals. Like Alternative 1, however, each resulted in degradation of the geographic location goal from the Base Case. In an attempt to overcome this difficulty three more alternatives, identified as Alternatives 2B, 2C, and 4B, were developed. These structures were created by the redesignation of the homebase locations of two of the regiments of Alternatives 2 and 4 (now 2A and 4A). Although some improvements in the geographic location goal were realized, all degradation from the Base Case could not be eliminated.

(e) One final regimental structure, identified as Alternative 5, was developed and again approved by ODCSOPS for analysis. This structure was identical to the Alternative 4B structure except that all cavalry squadrons affiliated with an armored cavalry regiment were combined into a single large regiment referred to as the CORPCAV. This 16 regiment structure provided no improvement over that realized by other alternatives.

(f) A listing of each structure and details of its development are included in Appendix D. Achievement function values obtained for each alternative structure are in Table 3-1. The development of general observations and specific findings for each of the questions to be answered by the analysis completed this portion of the study.

(5) Study Report. The study report was prepared, approved for release by the study agency, and delivered to the study sponsor in accordance with the policies of the Concepts Analysis Agency.

Section II. THE ALLOCATION MODEL

2-4. THE MODEL

a. **General.** An overview of the Allocation Model is included as Appendix C. A more detailed description, to include the calculations of the goals, achievement functions, and constraints may be found in Appendix C of the URSA III Study Report. The remainder of this paragraph provides only a brief description of these topics.

b. Goals and Measures of Effectiveness

(1) In this model the importance of goals is preemptive--that is, the weight attached to obtaining the best possible solution to the highest priority goal is infinitely more important than that attached to the second. Similarly, the second priority goal is infinitely more important than the third, etc. Because of this the optimal value of each higher priority achievement function is imposed as a constraint on subsequent optimizations.

(2) The highest priority goal (see Table 1-1) was that personnel of the same grade and MOS should have an equal interval between overseas tours regardless of regimental affiliation. In attempting to satisfy this goal, the model allocated CONUS spaces to those regiments which were initially CONUS light and OCONUS spaces to those which had an overage in CONUS. For each allocation the measure of effectiveness (MOE) in achieving this goal was the sum of the deviations between the computed turnaround time for each regiment and the Army-wide turnaround time calculated for that grade and MOS.

(3) The promotion opportunity goal caused the model to attempt to distribute available spaces so that every regiment had a similar grade distribution pyramid. The MOE for this goal was the sum of the deviations between the higher-to-lower grade ratios for each regiment and those of the MOS as a whole.

(4) The geographic distribution goal was formulated as a maximization function in which a profit was associated with each location and regiment combination. Maximum profit was associated with the allocation of spaces at a CONUS installation to regiments which were homebased there. Similarly, maximum profit was associated with allocation of OCONUS spaces to appropriate regiments, i.e., spaces in Germany to those regiments which had their OCONUS components there. Other location and regiment combinations were awarded points on a diminishing scale. The regimental structure alternative which best satisfied this goal was the one with the highest achievement function value.

(5) The unit opportunity goal sought to achieve the same ratio of ERA spaces to battalion TOE (unit) spaces for each regiment. The sum of the deviation between the ratio of each regiment and the Army-wide ratio for that grade and MOS provided the MOE used to evaluate achievement of this goal.

(6) In satisfying the short-tour opportunity goal, the model attempted to achieve the same ratio of spaces in short-tour areas to total spaces for each regiment. Again the sum of the deviations between the regimental ratios and the Army-wide ratio provided the MOE for determining goal achievement.

(7) The equal size goal caused the model to attempt to provide regiments with an equal number of total spaces for each grade and MOS. Regimental deviations from the average regimental size provided the MOE upon which to compare alternatives.

c. Constraints. In addition to the goals shown above, certain constraints were also operative:

(1) The model was required to distribute all of the available spaces.

(2) In order to reflect the unit replacement cycles, the model distributed CONUS and OCONUS spaces to accommodate the flow into and out of replacement units on a fair share basis.

d. Reports. Results of the allocation process are tabulated and written in various report formats by postprocessor routines of the Allocation Model. Reports were provided to the study sponsor for each of the alternative regimental structures examined.

2-5. GOAL SATISFACTION

a. General

(1) In a perfect world, there would be sufficient assets (available personnel spaces) so that each of the goals would be fully satisfied for every MOS, grade, and regiment combination. In the real world, however, there are not sufficient assets for this to happen, and even the best possible distribution may have variance between regiments. This is particularly true if the regiments have uneven initial characteristics, if the MOS under consideration has relatively few assets (available spaces) for distribution, or if the goal being satisfied is of a low priority.

(2) Figures 2-1 through 2-6 show examples of the degree to which the various goals were satisfied by the Allocation Model. Alternative 2B results were used because they best illustrate the degree of goal satisfaction achievable by the model. Since one regiment, the 1st Cavalry, was neither authorized nor allocated any MOS 19E/K spaces, data on only 16 regiments is included in the examples.

b. CONUS Turnaround Time (Priority 1)

(1) Figure 2-1 shows the distribution of CONUS turnaround time for E-5s before and after the allocation of available spaces. The variation between regiments in their initial condition is substantial; after the allocation, the regiments are clustered very closely about the MOS average of 2.1 years. This clustering is achieved even though only about 13 percent of the total E-5 spaces are available for distribution.

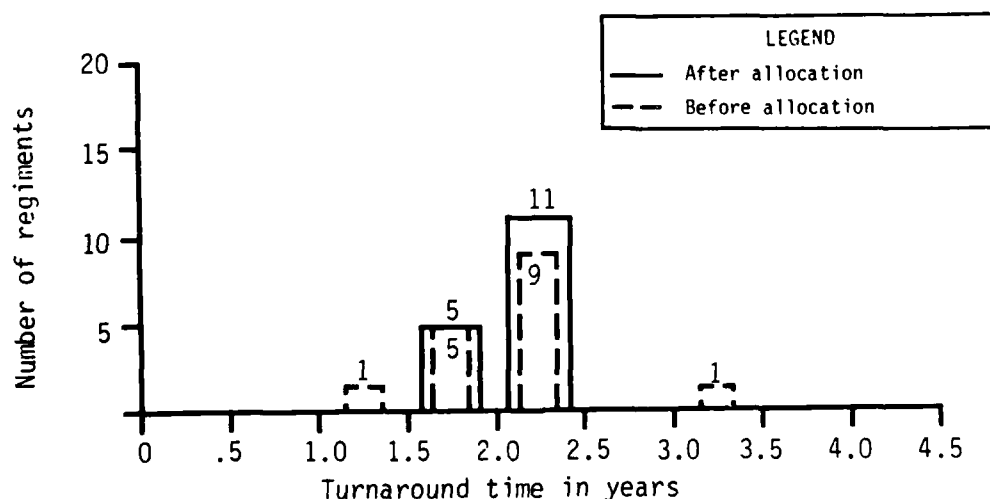


Figure 2-1. CONUS Turnaround Time, Grade E-5

(2) Figure 2-2 illustrates the before and after condition for grade E-6 and is typical of the higher NCO grades. Both the clustering and the overall increase in turnaround times can be achieved because in the higher grades over 33 percent of the total spaces are available for allocation.

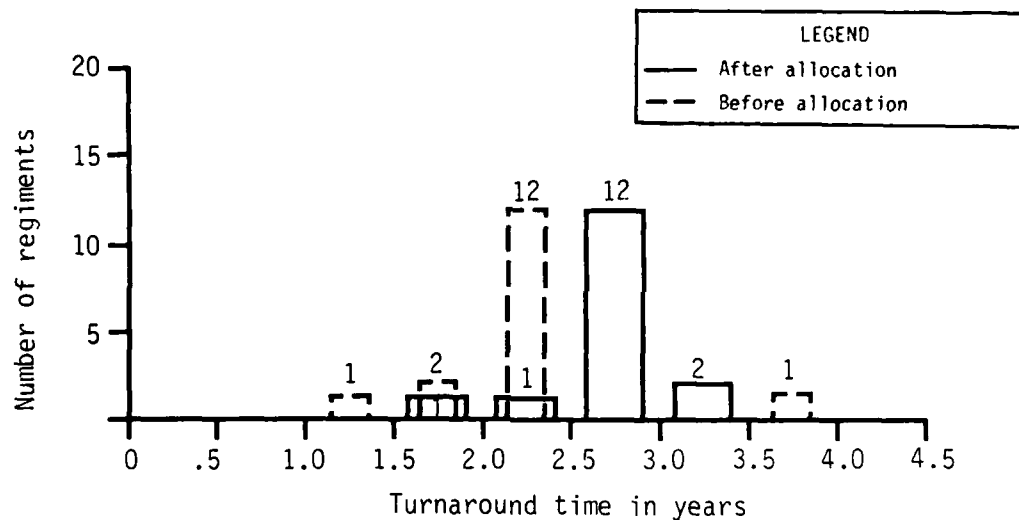
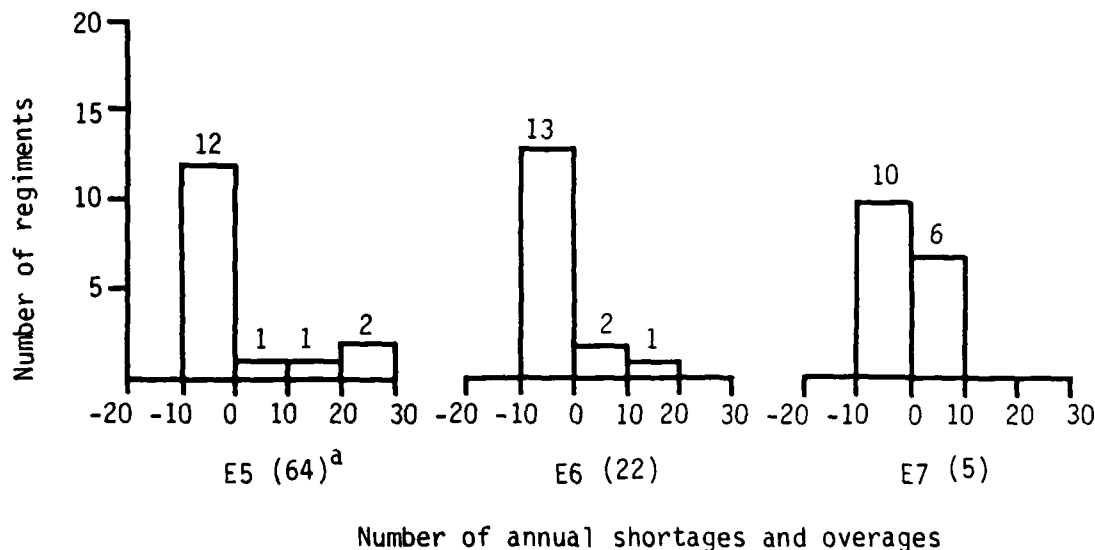


Figure 2-2. CONUS Turnaround Time, Grade E-6

c. Promotion Equity (Priority 2)

(1) The current NCO promotion system is centralized in order to promote the number of soldiers required to fill anticipated shortages. If each regiment had a grade-structure pyramid which was exactly proportional to the pyramid for the entire MOS, then each would produce through promotion exactly what it required at the next higher grade.

(2) Regiments whose grade structure differs from that of the entire MOS will either have too many or too few soldiers promoted. Figure 2-3 illustrates the number of regiments which are "over- or under-promoters," and the number of shortages or overages which would result from centralized promotion. This is the total number of personnel who would have to be reaffiliated or transferred annually to other regiments.



^a Annual total number of shortages and overages

Figure 2-3. Forced Transfers

d. Geographic Correctness (Priority 3)

(1) One index of the geographic correctness of the allocation is the evenness or unevenness of the proportion of total positions at the homebase.

(2) As shown by Table 2-3, there is substantial disparity in each regiment's fraction of homebase to total CONUS positions. This disparity reflects the distribution of positions at CONUS installations; no significant improvement can be made in this area.

Table 2-3. Percentage of MOS 19E/K CONUS Regimental Positions at the Homebase (after allocation)

Regiment	Grade		
	E-5	E-6	E-7
66th AR	76	57	48
67th AR	76	57	48
37th AR	75	55	44
34th AR	76	55	44
8th CAV	76	57	48
32d AR	76	58	49
68th AR	77	56	44
77th AR	77	56	44
70th AR	100	76	67
64th AR	79	57	47
73d AR	37	34	2
69th AR	52	37	25
7th CAV	48	36	25
4th CAV ^a	0	0	0
3/11th CAV	58	59	61
3/2d CAV	58	63	68

^aThe 4th CAV Regiment has only 19D and 19Z at its homebase.

e. Unit-tour Opportunity (Priority 4)

(1) Perfect satisfaction of the unit-tour opportunity goal would result in each regiment having exactly the same ratio of unit spaces to total spaces.

(2) Figure 2-4 shows that there does exist a difference between regiments in the ratio of unit spaces to total spaces. This disparity is basically the same for every grade and results from the conflict between this and the preceding higher priority goals.

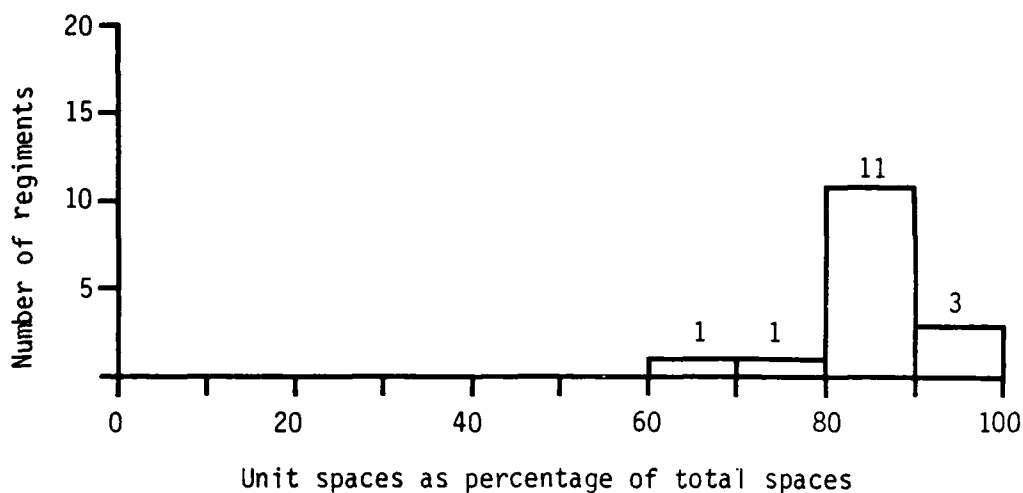


Figure 2-4. Unit-tour Opportunity, Grade E-5

f. Short-tour Opportunity (Priority 5)

(1) Figure 2-5 illustrates the number of regiments which have a given fraction of short-tour spaces to total spaces for grade E-5. This distribution is similar at every grade.

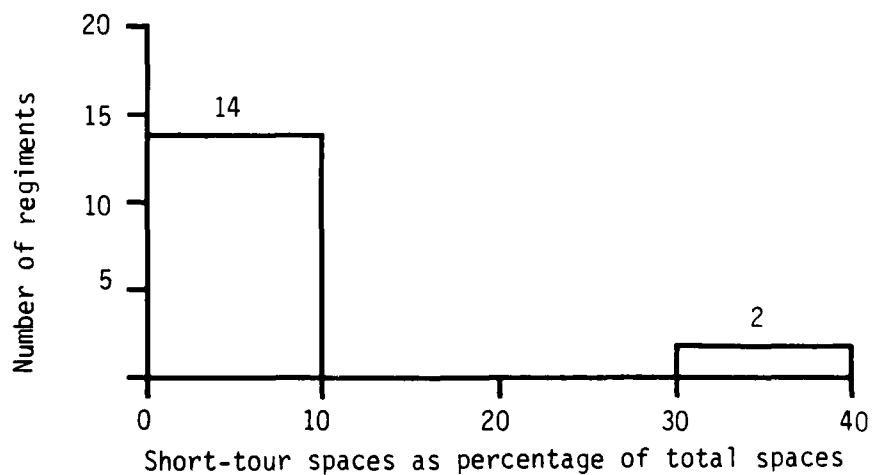


Figure 2-5. Short-tour Opportunity, Grade E-5

(2) This disparity results from two causes: first, the decision to group units into regiments in a basically "long-tour regiment", "short-tour regiment" fashion, and secondly, the scarcity of ERA positions in short-tour areas.

g. Regimental Size (Priority 6)

(1) Figure 2-6 illustrates the variation in total MOS 19E/K strength of the regiments after allocation and shows a considerable disparity.

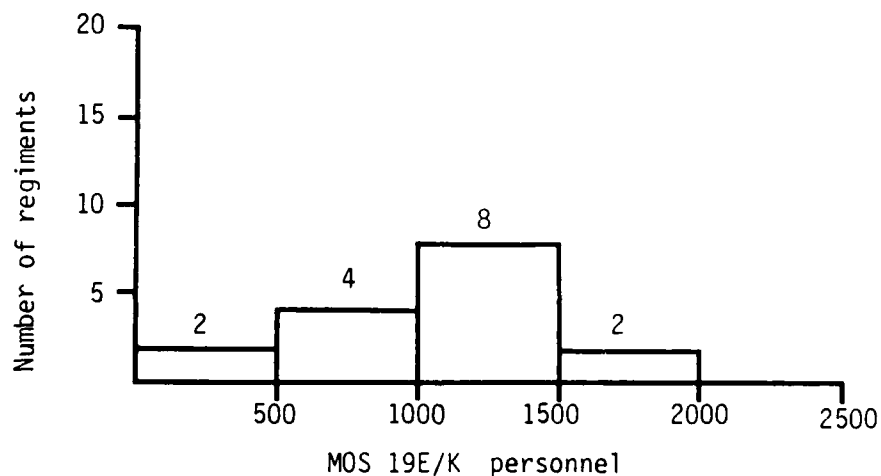


Figure 2-6. Regimental Size

(2) The differences illustrated result from both a very uneven initial condition of the regiments (the number of assigned battalions varies from three to six) and the use of the available assets to satisfy higher priority goals.

2-6. SENSITIVITY TO GOAL PRIORITIZATION

a. The allocation of ERA spaces was accomplished by sequential linear goal programming. The lower priority goals could only be satisfied insofar as they did not reduce the achievement of any higher priority goal. As would be expected, then, the degree to which a goal could be satisfied was sensitive to its priority and the order in which higher priority goals were satisfied.

CAA-SR-84-8

b. The sensitivity of the Allocation Model to the order in which the goals were prioritized was thoroughly examined during the URSA III Study. The prioritization displayed in Table 1-1 was established as a result of this analysis. For a complete discussion of this sensitivity analysis see Chapter 2 of the URSA III Study Report.

CHAPTER 3

STUDY RESULTS

3-1. INTRODUCTION. The purpose of this chapter is to present study results which are directly related to the questions to be answered by the analysis. These questions are:

- a. Which alternative regimental structure provides the least deviation in turnaround time, promotion opportunity, and geographic location?
- b. What should the personnel authorizations be for each regiment by grade and MOS?

3-2. QUESTION TO BE ANSWERED - REGIMENTAL STRUCTURE

a. The Base Case and alternative regimental structures are listed in Appendix D. Achievement function values for the Base Case and each alternative are contained in Table 3-1.

Table 3-1. Achievement Function Values^a

Achievement function	Base Case	Alternative							
		1	2A	2B	2C	3	4A	4B	5
Turnaround time	1,816	1,292	738	738	738	738	628	628	623
Promotion	1,025	754	545	545	545	545	496	496	496
Location	5,430	4,918	4,853	4,999	4,928	4,999	4,810	4,955	4,955
Unit tour	1,411	1,190	876	876	876	876	712	712	712
Short tour	770	799	849	849	849	849	842	842	842
Regimental size	4,347	3,716	4,159	4,159	4,159	4,160	3,851	3,851	4,089

^aSmaller numbers indicate better solutions except for location where larger is better.

b. Table 3-2 summarizes the percent change of the achievement function values for each goal from the Base Case values.

Table 3-2. Achievement Function Values^a
(percent change from Base Case)

Achievement function	Alternative							
	1	2A	2B	2C	3	4A	4B	5
Turnaround time	29	59	59	59	59	65	65	65
Promotion	26	47	47	47	47	52	52	52
Location	-9	-11	-8	-9	-8	-11	-9	-9
Unit tour	16	38	38	38	38	50	50	50
Short tour	-4	-10	-10	-10	-10	-9	-9	-9
Regimental size	15	4	4	4	4	11	11	6

^aPositive change indicates an improvement over the Base Case; negative change indicates a degradation from the Base Case.

c. Alternatives 4A, 4B, and 5 provide the best results in the turnaround time and promotion objectives. The Base Case structure provides the best results in the geographic location objective.

d. Alternative 4B provides the best overall result when all six objectives are considered.

3-3. QUESTION TO BE ANSWERED - PERSONNEL AUTHORIZATIONS

a. **Allocation Data.** Personnel authorizations for each regiment by grade and MOS were developed using the Allocation Model described in paragraph 2-4. Allocation Model output reports describing the authorizations in detail were provided to the study sponsor. An example of the detailed data is at Appendix E. While most detailed data is omitted from this report some general comments concerning the allocations are provided.

(1) MOSs 19E and 19K were combined for analysis.

(2) One regiment, the 1st Cavalry, did not have any MOS 19E or 19K personnel assigned to its regimental units. Consequently this regiment was not included in the optimization and did not receive an allocation of 19E/K ERA spaces.

(3) Table 3-3 provides general information concerning the MOS 19E/K authorization data used in this study.

Table 3-3. MOS 19E and 19K Authorization Data

Spaces	FY 87
Organic to regimental units	13,817
Available to be allocated (ERA spaces)	2,536
Total Army	16,353

(4) The available CMF 19 (E + K) personnel spaces were distributed over 11 armor and 5 cavalry regiments.

b. Data Availability. Allocation data not included in this report is available upon request from the study agency.

CHAPTER 4

OBSERVATIONS

4-1. PURPOSE. The purpose of this chapter is to present observations which, while not directly related to the questions to be answered, are of significance in the process of transitioning to a regimental system with unit replacement.

4-2. GENERAL

a. The Allocation Model distributes ERA assets to achieve the best overall solution for each MOS. The degree of goal satisfaction, however, varies between regiments. Therefore, to augment the numerical measures of the achievement functions, observations pertinent to each goal are provided.

b. Within regiments, goal satisfaction varies by grade. For some goals the degree of satisfaction increases with increasing grade while for other goals an inverse relationship exists.

c. Grade E3 and E4 positions will be mostly filled by first-termers. Their opportunities are determined by their initial assignments rather than by regimental structures. In this chapter, only careerist (grades E5-E7) results will be discussed.

d. The ability of the personnel system to achieve MOS equity in career opportunities between regiments depends upon the balance of the regimental structure and the number and disposition of ERA assets available for distribution after theater flow requirements as discussed in paragraph 4-2e below have been satisfied. The relatively few number of ERA positions in MOS 19 E/K are shown in Table 4-1. As grade increases, the ratio of ERA-to-unit spaces increases, but most positions remain in regimental units.

Table 4-1. MOS 19 E/K Authorized Positions

Grade	Number in regimental units	Number in ERA	Total	Percentage in units	Percentage in ERA
E3	3,770	212	3,982	94.7	5.3
E4	3,512	350	3,862	90.9	9.1
E5	3,642	548	4,190	86.9	13.1
E6	2,070	854	2,924	70.8	29.2
E7	823	572	1395	59.0	41.0
Total	13,817	2,536	16,353	84.5	15.5

e. Theater flow requirements are generated whenever the stay time in a theater exceeds the stay time in stabilized units. For example, the CONUS stay time for individuals in companies which cycle to long-tour areas is 18 months (1.5 years). Assume that the average stay time in CONUS for a given grade is 3.5 years. Because the long-tour cycle requires stabilization of individuals for 1.5 years in CONUS, careerists must be assigned to the unit during the unit's "refill window." These careerists must be reassigned to the unit from either CONUS or OCONUS. If from OCONUS, they have only 1.5 years in CONUS at the time of the unit's move to OCONUS. To be from CONUS, a sufficient number of the regiment's soldiers must be completing a 2-year assignment in a CONUS ERA position. The goal of equalizing turnaround time opportunity requires that the careerists come from CONUS positions. Therefore, before goal optimization CONUS ERA positions must be distributed to regiments to meet unit flow requirements. If there are not enough ERA positions, those available are prorated according to each regiment's flow requirements. For Alternative 4B, the effect of flow requirements on the number of CONUS ERA positions available for allocation is shown in Table 4-2.

Table 4-2. CONUS Flow Requirements for Alternative 4B

Grade	Required CONUS flow	Prorated CONUS flow	Total CONUS flow	Available for goals
E3	--	--	165	165
E4	--	--	221	221
E5	776	492	497	5
E6	1,171	742	749	7
E7	545	506	511	5

f. With sufficient ERA resources, a goal's achievement function value may be changed until the iteration in which that function is optimized. Whenever a shortage of ERA assets exists, the optimization of a goal affects the system's ability to improve lower priority goals. This is shown in Table 4-3 using results from each iteration of Alternative 4B. The value of the location goal was free to fluctuate until the third iteration was complete, at which time it became fixed. The unit-tour goal stabilizes after the second iteration when it could have changed through the fourth. The constraints imposed by the first two goals precluded further improvement during the unit-tour optimization iteration. Similarly, short-tour opportunity becomes fixed after the second iteration. For practical purposes the regimental size goal is fixed at the same time.

The improvement gained in the last iteration is due to fractional, balanced shifts that result in no net change to the previous achievement function values.

Table 4-3. Goal Satisfaction for Alternative 4B

Goal	Achievement function values by iteration/goal					
	1/TAT	2/Promotion	3/Location	4/Unit tour	5/Short tour	6/Size
Turnaround time (TAT)	628	628	628	628	628	628
Promotion	557	496	496	496	496	496
Location	4,579	4,579	4,955	4,955	4,955	4,955
Unit tour	718	712	712	712	712	712
Short tour	840	842	842	842	842	842
Regimental size	3,853	3,864	3,864	3,864	3,864	3,851

NOTES:

For each goal but location the value reflects the number of spaces required to achieve complete equity. For these goals the smallest value is best. For the location goal, the value indicates the profit associated with the allocations. The largest value is best in this case.

The boxed numbers denote the iteration in which a goal is optimized.

4-3. OBSERVATION - TURNAROUND TIME EQUITY

a. All alternative structures have less spread between regiments in turnaround time than the Base Case. Within each alternative the spread decreased with increasing grade.

b. Table 4-4 shows the turnaround times for grade E5. The turnaround time for this grade in a representative individual replacement system would be about 2.4 years. The regiments which deviate from the mode by more than one quarter are identified.

**Table 4-4. Turnaround Times for Grade E5
(number of regiments)**

Turnaround time (years)	Base Case	Alternative							
		1a	2A	2B	2C	3	4A	4B	5b
1.00 - 1.25	2	0	0	0	0	0	0	0	0
1.26 - 1.50	1	1	0	0	0	0	0	0	0
1.51 - 1.75	1	1	0	0	0	0	0	0	0
1.76 - 2.00	0	2	6	5	5	5	3	3	4
2.01 - 2.25	0	3	8	9	9	9	12	12	9
2.26 - 2.50	10	8	2	2	2	2	1	1	2
2.51 - 2.75	0	0	0	0	0	0	0	0	0
2.76 - 3.00	2	0	0	0	0	0	0	0	0

^aThe 8th CAV is not authorized MOS 19E/K in this alternative.

^b3/2d CAV and 3/11th CAV are combined into one regiment.

4-4. OBSERVATION - PROMOTION OPPORTUNITY

a. Promotion opportunity remained essentially unchanged regardless of the regimental structure considered. However, most regiments were close to the modeled average for each grade. There were simply not enough ERA resources in the required theaters to satisfy the needs of the outlying regiments.

b. Deviation from the MOS average decreased as grade increased. For grades E6 and E7, 90 percent of the regiments provide opportunities within 3 months of the MOS average. Table 4-5 shows the time-in-grade situation for grade E5 after allocation with the outlying regiments identified.

**Table 4-5. Promotion Opportunity after Allocation for Grade E5
(number of regiments)**

Time in grade (years)	Base Case	Alternative				
		1	2a	3	4a	5b
2.75 - 3.00	2	1	2	1	2	2
3.01 - 3.25	0	0	0	0	0	0
3.26 - 3.50	10	10	12	13	12	12
3.51 - 3.75	4	2	0	0	0	0
3.76 - 4.00	0	2	2	2	2	1

^aAll variations have the same opportunities.

^b3/2d CAV and 3/11th CAV are combined into one regiment.

4-5. OBSERVATION - HOMEBASING OPPORTUNITY

a. For all of the proposed structures the number of ERA positions at every homebase except Fort Knox are too few to significantly influence homebasing opportunity.

b. For regiments with units stationed at multiple CONUS posts the choice of the regiment's homebase can greatly affect homebasing opportunity.

c. The opportunity to be stationed at the regiment's homebase decreased as grade increased. For grade E7, most regiments provided a 40 to 50 percent opportunity for homebase assignments during CONUS tours. The regiments which vary from this range are shown in Table 4-6.

Table 4-6. Homebasing Opportunities after Allocation for
Grade E7 of Selected Regiments (percentage of
CONUS positions authorized at homebase)

Regiment	Base Case	Alternative							
		1	2A	2B	2C	3	4A	4B	5
66th AR	83	46	48	48	48	48	48	48	48
69th AR	75	67	25	25	25	25	25	25	25
70th AR	63	63	67	67	67	67	47	47	47
73d AR	73	75	2	2	2	98	2	2	2
4th CAV	0	0	0	0	0	0	0	0	0
7th CAV	23	23	25	25	25	25	25	25	25
3/2d CAV	32	29	32	68	68	39	39	61	65 ^a
3/11th CAV	32	29	39	61	39	32	32	68	65 ^a
8th CAV	83	0	48	48	48	48	48	48	48

^a3/2d CAV and 3/11th CAV are combined into one regiment.

d. The changes in the percentages from the Base Case to Alternatives 1 and 2 reflect changes in the structures. The percentages in Alternatives 2 through 5 mostly reflect the effects of flow requirements (paragraph 4-2e) rather than those of the allocation process. Most CONUS ERA positions are "committed" to regiments before any optimization is attempted. Major changes between alternatives are discussed below.

(1) In Alternatives 4 and 5, the 70th AR loses its nonrotating battalion at its homebase.

(2) The percentages for grade E7 of the 73d AR are not representative of its other top grades. Grades E5 and E6 average about 35 percent for all alternatives except for Alternative 3 in which the average is 65 percent. The E7 percentages are skewed for this regiment by a low authorization for this grade. In Alternative 3, the 73d AR exchanges its Fort Irwin unit for a Fort Knox unit and designates Fort Knox (with many ERA spaces) as its homebase.

(3) The 4th CAV is homebased at Fort Riley. Because there are no 19E/K authorized in the units at that post, the percentage is zero. Most of the regiment's 19E/K positions are located at Fort Polk. However, many of the other CMF 19 positions are at Fort Riley, thus making it a possible homebase.

(4) The changes in 3/2d CAV and 3/11th CAV are due to changes in homebase designations. When Fort Bliss is the homebase and Fort Knox is an alternate base, both regiments are in the 30 to 40 percent range. When the post designations are reversed, the ranges became 60 to 70 percent. In Alternative 2C, one regiment is homebased at each post.

(5) In Alternative 1, the 8th CAV loses its tank MOSs but retains its other CMF 19 positions.

4-6. OBSERVATION - UNIT-TOUR EQUITY. There are too few MOS 19E/K ERA spaces to achieve unit-tour equity. Grade E7 is authorized the greatest percentage of ERA positions. In a representative individual-replacement system a soldier could expect to spend 59 percent of his E7 time in regimentally-designated units. For all of the proposed structures, the regimental average E7 unit-tour time ranges from 41 to 95 percent. Most regimental averages vary between 47 and 59 percent. Although the regiments with the extreme values differ by alternative, they are always one of the sets identified in Table 4-6.

4-7. OBSERVATION - SHORT-TOUR EQUITY

a. No alternative achieves any degree of short-tour equity. ERA resources are committed before the model optimizes the short-tour goal.

b. The two regiments with battalions stationed in Korea, the 69th AR and 73d AR, do not share all the Korean-based ERA positions. Most of these positions are distributed to other regiments in order to reduce their CONUS turnaround times. Table 4-7 shows the number of short-tour ERA spaces allocated by regiment for each proposed structure.

Table 4-7. Allocation of Korean-based ERA Positions

Regiment	Base Case	Alternative				
		1	2a	3	4a	5
69th AR	0	0	0	0	11	0
73d AR	0	15	17	17	7	17
All others	35	20	18	18	17	18

^aAll variations have the same allocation.

4-8. OBSERVATION - REGIMENTAL SIZE EQUITY

a. Regiments vary in size in direct proportion to the number of assigned units. The cavalry regiments are the smallest since their cavalry squadrons are each authorized, at most, one tank company.

b. Regiments remain about the same size unless changes to their assigned units occur. The smallest regiments, the 4th CAV and 7th CAV, have about 360 MOS 19E/K positions while the largest average about 1,625 positions. If MOS 19E/K positions were equally distributed to the 16 regiments, each would be authorized 1,022 spaces.

4-9. OBSERVATION - SUBREGIMENTAL AFFILIATION

a. Designating different regimental names to units of the same regiment reduces the unit-tour opportunities of soldiers affiliated with that regiment.

b. Nondivisional cavalry units have a history that is closely tied to their regimental names, i.e., the 3d Armored Cavalry Regiment. In the US Army Regimental System (USARS) squadrons of these units would become components of armor regiments with different designations, i.e., 3/11th Cavalry Regiment. Figure 4-1 illustrates subregimental affiliation in the 3/11th Cavalry Regiment as it is structured in Alternative 1. All of the tank companies are assigned to the 3/11th Cavalry Regiment yet each would retain the colors of its historical regiment, i.e., 3d ACR, 11th ACR, or 8th CAV. Soldiers serving in any of these units would be managed as part of the 3/11th Cavalry Regiment but would be affiliated with their named regiments.

c. The Allocation Model did not attempt to equalize opportunity within subregimental sets. If this were done (in effect creating more regiments), the different regimental colors in CONUS and OCONUS would still affect unit-tour opportunity.

d. A soldier who enlists for the 8th Cavalry Regiment could serve in a company of the 1-8 Tank Battalion in CONUS then move to an 11th ACR unit for his OCONUS tour. After becoming a careerist his next unit tour could either repeat the 1-8/11 pattern or he could serve in the 3d ACR unit followed by an 11th ACR unit. In each case he would have served his unit tours in the 3/11th Cavalry Regiment. But, while in the 3d and 11th ACR units he would be in an ACR environment, similar for him to an extra-regimental assignment.

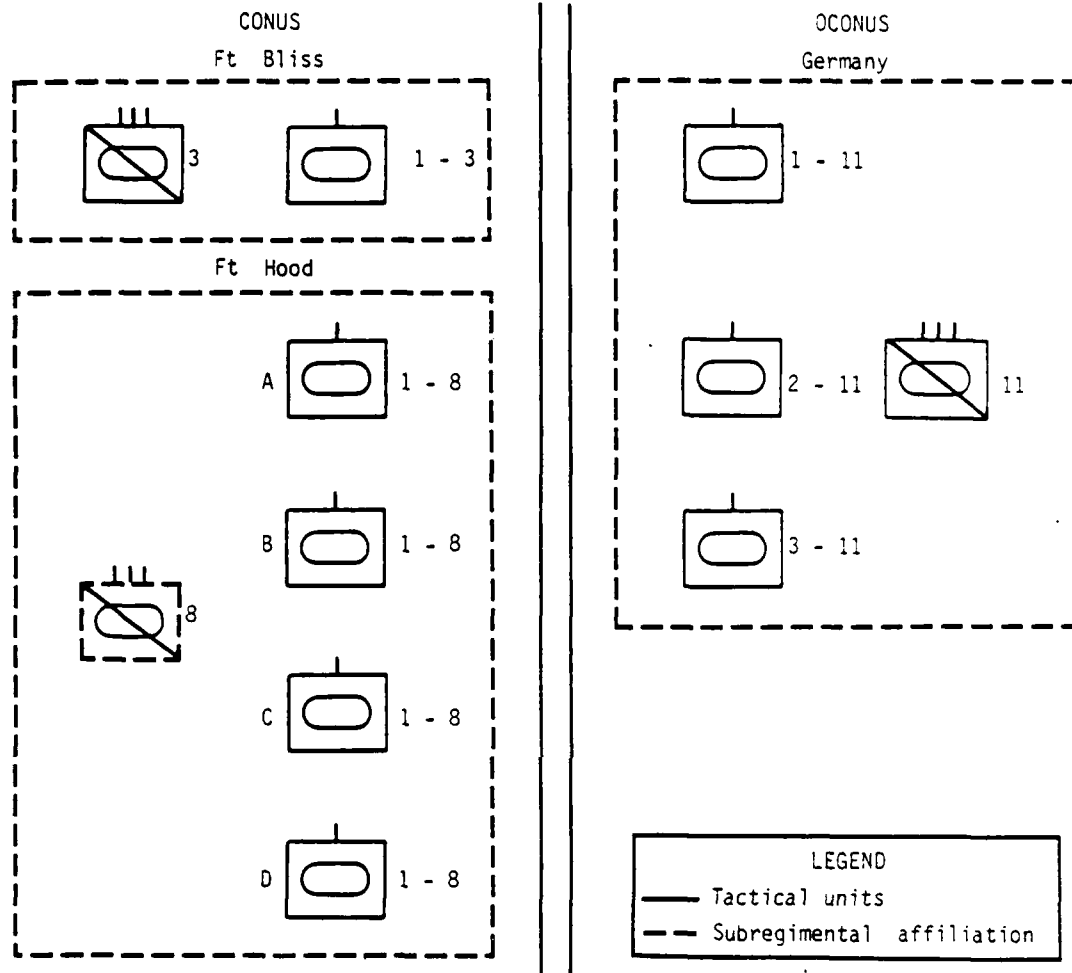


Figure 4-1. Assigned Tank Companies of the 3/11th CAV Regiment for Alternative 1

e. A soldier who enlists for the 3d ACR could follow a similar pattern, but his opportunity to serve under his "color" would be different. In CONUS only one of five tank companies is in the 3d ACR. In OCONUS he cannot serve in a 3d ACR unit. Considering only TOE authorized spaces, he will serve less than one-fifth of his unit time in his affiliated regiment. (NOTE: Each ACR squadron also contains two tank platoons per armored cavalry troop for a total of six additional platoons per squadron.) Table 4-8 shows the average unit-tour opportunities of soldiers with the various affiliations.

**Table 4-8. Unit-tour Opportunities in the 3/11th CAV Regiment for
Alternative 4B
(percentage of time in affiliated unit)**

Grade	Average for all USARS regiments	3/11th Regiment	Subregimental Affiliation		
			3d ACR	11th ACR	8th CAV
E5	87	100	18.7	56.3	25.0
E6	71	100	18.5	55.4	26.1
E7	59	86	15.5	46.4	24.1

4-10. OBSERVATION - CROSS-REGIMENTAL ASSIGNMENTS. Soldiers serving in units that belong to different regiments but to the same tactical headquarters are subject to reassignment into a regimental unit other than their own. The likelihood of cross assignments increases as the number of ERA positions at that location decrease. With few positions outside the unit, only inter-unit or PCS moves are possible when reassignment is required. For example, consider the 3d ACR at Fort Bliss (Figure 4-2). In each alternative but the last, each squadron belongs to a different regiment but is under the command of the tactical regimental commander. Fort Bliss is authorized only seven ERA MOS 19E/K positions. Since each squadron has only one tank company, reassignment between regiments may be forced when required for administrative, judicial, or readiness reasons.

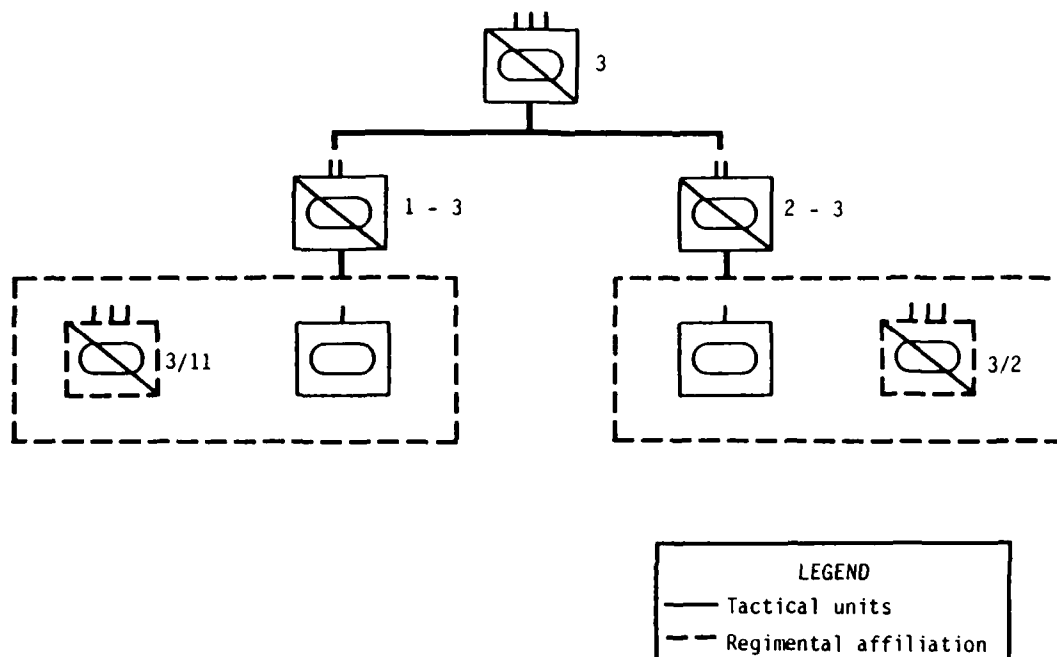


Figure 4-2. 3d ACR Tank Company Relationships

4-11. OBSERVATION - MISCELLANEOUS STRUCTURAL FEATURES

a. Each proposed armor structure has features (Table 4-9) that are not analyzed in the measures of effectiveness but may be considered during selection of the final armor regimental structure.

b. Units assigned to regiments with tank and cavalry units require training for each mission. The number of regiments with this requirement is included in Table 4-9.

Table 4-9. Miscellaneous Structural Features

Feature	Base Case	Alternative				
		1	2	3	4	5
Number of regiments	17	17	17	17	17	16 ^a
Multiple CONUS posts	4	7	6	6	6	5 ^a
Nonrotatable regiments	0	0	2	2	2	2
Two-theater regiments	2	2	0	0	0	0
Subregimental affiliation	2	4	2	2	2	1 ^a
Cross-regimental leveling	2	2	2	2	2	0
Armor/Cavalry missions	0	3	2	2	2	1

^a3/2d CAV and 3/11th CAV are combined into one regiment.

4-12. OBSERVATION - MOS 19E and 19K SEPARATION

a. If MOS 19E and 19K are not considered compatible, the number of units that may be linked for unit movement is reduced. Table 4-10 illustrates the effects of incompatibility in terms of company-sized equivalent units.

Table 4-10. Linked and Rotatable Companies (Alternative 4B)

Type unit	Number of companies	Linked and rotatable companies	
		19E/K Substitutable	19E/K Incompatible
Tank company	207	176	136
Tank company, ACS	24	12	12
Armored Cavalry troop (with tanks)	12	12	12

b. Ten tank battalions (40 companies) in three different regiments become nonrotatable if M60 and M1 tankers are considered incompatible. This represents nearly 23 percent of the currently linked and rotatable tank companies in armor regiments.

APPENDIX A
STUDY CONTRIBUTORS

1. STUDY TEAM

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APPENDIX B

STUDY DIRECTIVE

Section I. BASIC STUDY DIRECTIVE



DEPARTMENT OF THE ARMY
OFFICE OF THE DEPUTY CHIEF OF STAFF FOR OPERATIONS AND PLANS
WASHINGTON, DC 20310

REPLY TO
ATTENTION OF

DAMO-ODO

25 AUG 1983

SUBJECT: U. S. Army Regimental Personnel Allocation Study
(REPAST)

Director
US Army Concepts Analysis Agency
8120 Woodmont Avenue
Bethesda, Maryland 20814

1. PURPOSE OF DIRECTIVE. This directive provides guidelines for analysis of several aspects of the U. S. Army Regimental System which is being developed and implemented.

2. BACKGROUND.

a. In November 1982, CAA was tasked by the Office of the Deputy Chief of Staff for Personnel (ODCSPER) to conduct URSA III (Enclosure 1). URSA III has now been completed.

b. The Office of the Deputy Chief of Staff for Operations and Plans (ODCSOPS) has been tasked to develop and implement a regimental system for combat arms units. To date, a regimental system has been developed for infantry, armor, field artillery and air defense units. A regimental system for cavalry, engineer and aviation units is now under development.

3. PURPOSE OF STUDY. To assist in the development and implementation of a regimental system for cavalry, engineer and aviation units.

4. STUDY PROPONENT. Office of the Deputy Chief of Staff for Operations and Plans.

5. STUDY AGENCY. US Army Concepts Analysis Agency (CAA).

6. TERMS OF REFERENCE.

a. Objectives.

(1) Using the model developed for URSA III, analyze various alternatives for cavalry, engineer and aviation regiments to determine, for each branch, the proposal which minimizes the deviation between regiments in turnaround time, promotion

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opportunity and geographic location.

(2) Determine the allocation of CMF 19 (E & K) spaces for each cavalry regiment.

(3) Determine the allocation of the high density CMF's (MOS 12B, 12C, 51B and 51C) to each engineer regiment.

(4) Determine the allocation of CMF 67 to each aviation regiment.

b. Scope.

(1) Cavalry, engineer and aviation units will be considered.

(2) Enlisted personnel in CMF 12, 19, 51 and 67 will be considered.

(3) Airborne, ranger and special forces authorizations will not be considered.

(4) The analysis will consider only a peacetime, steady-state operation.

(5) The unit long-tour cycle will consist of 18 months in CONUS followed by 18 months OCONUS.

(6) The unit short-tour cycle will consist of 24 months in CONUS followed by 12 months OCONUS.

(7) The analysis will consider homebasing requirements for designated regiments. Site specific data will be used.

c. Timeframe. FY 87.

d. Assumptions.

(1) Worldwide deployment of units for FY 86 and beyond will be fixed.

(2) Personnel authorization documents for FY 87 will be used. No increase in personnel authorizations will be permitted.

(3) Regiments will be as designated by ODCSOPS.

e. Questions to be answered by the analysis.

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(1) Which alternative for each type unit provides the least deviation in turnaround time, promotion opportunity and geographic location.

(2) What should the personnel authorizations be for each regiment by grade and MOS.

7. RESPONSIBILITIES.

a. ODCSOPS will:

- (1) Provide a study coordinator to support the study.
- (2) Submit DD Form 1498 in accordance with DA Pam 5-5.
- (3) Prepare an evaluation of study results in accordance with AR 5-5.
- (4) Provide authorization data files in format compatible with the URSA III model.

b. CAA will:

- (1) Designate a study director and establish a study team.
- (2) Communicate with appropriate agencies for data necessary for the study accomplishment.
- (3) Provide ADP support as required for study accomplishment.
- (4) Provide final study results to the study proponent.

8. REFERENCES.

- a. AR 5-5, the Army Study System, 5 July 1977.
- b. The Army Authorization Documents System (TAADS), ODCSOPS.

9. ADMINISTRATION.

- a. Support. Secretarial support will be provided by CAA.
- b. Milestone Schedule.
 - (1) Deliver authorization data files to CAA D Day

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- | | |
|----------------------------------|--------------|
| (2) IPR | D + 30 Days |
| (3) IPR | D + 100 Days |
| (4) Accept final report from CAA | D + 145 Days |

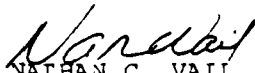
c. Control Procedures. ODCSOPS study coordinator will provide guidance for the study.

d. Action Document. A final study report will be published and copies provided to the study proponent.

e. Coordination. This tasking directive has been coordinated with CAA in accordance with AR 10-38.

FOR THE DEPUTY CHIEF OF STAFF FOR OPERATIONS AND PLANS:

1 Encl
as


NATHAN C. VAIL
Brigadier General, GS
Acting Director of Operations,
Readiness and Mobilization

Section II. MODIFICATION TO STUDY DIRECTIVE



REPLY TO
ATTENTION OF

DEPARTMENT OF THE ARMY
US ARMY CONCEPTS ANALYSIS AGENCY
8120 WOODMONT AVENUE
BETHESDA, MARYLAND 20814

21 DEC 1983

CSCA-FSP

SUBJECT: US Army Regimental Personnel Allocation Study (REPAST)

Deputy Chief of Staff for
Operations and Plans
ATTN: DAMO-ODO
Department of the Army
Washington, DC 20310

1. Reference letter, DAMO-ODO, HQDA, 25 August 1983, SAB.
2. In August 1983, CAA was tasked by the Office of the Deputy Chief of Staff for Operations and Plans (ODCSOPS) to conduct REPAST. Study milestones were based on delivery by ODCSOPS of input data for cavalry, engineer, and aviation branches.
3. The cavalry data were received on 2 December. We will do the analysis for the cavalry segment of REPAST to take advantage of our personnel who are trained on the model and familiar with the cavalry data.
4. Informal coordination indicates that the engineer and aviation data are not presently available and, at best, may take another six weeks to deliver. This being the case, I believe it is in the best interest of all to complete the analysis of the cavalry data and terminate the study. When and if the other data become available we can arrange to do a follow-on effort.

David C. Hardison
DAVID C. HARDISON
Director

APPENDIX C

THE ALLOCATION MODEL - AN OVERVIEW

C-1. INTRODUCTION. The purpose of this appendix is to provide an overview of the Allocation Model. For a more detailed description, to include the mathematical calculations of the goals, achievement functions,* and constraints, see Appendix C of the URSA III Study Report.

C-2. GOALS AND ACHIEVEMENT FUNCTIONS

a. The Allocation Model is a sequential linear goal programming model in which the decision variables, $X(I, J, K)$, are the number of grade K ERA spaces allocated from location I to regiment J. Goals are formulated as functions of the form

$$\sum_I [A(I, J, K) \times X(I, J, K)] = \text{Goal}$$

where: $A(I, J, K)$ = some coefficient associated with location I, regiment J, and grade K

$X(I, J, K)$ = decision variable

Goal = goal to be achieved

And, since the goals are not always perfectly achievable, positive and negative deviation variables, DP and DN, are introduced so that the final form of the rows is

$$\sum_I [A(I, J, K) \times X(I, J, K)] + DN(J, K) - DP(J, K) = \text{Goal } 1$$

and the achievement function is

*The term achievement function is used throughout this report in lieu of the more frequently used term, objective function. This is done to emphasize the fact that it is the degree of achievement of the goal which is being measured.

$$\text{MIN } \sum_J \sum_K \left[|DN(J,K)| + |DP(J,K)| \right].$$

b. In this model, the importance of goals is preemptive; that is, the model satisfies the first goal as well as possible, subject to the binding constraints. Then it satisfies the second goal as well as possible, subject to the binding constraints as well as the condition that the previous achievement function cannot be degraded. For example, assume the deviation variables for Goal 1 are $DN1(J,K)$ and $DP1(J,K)$; for Goal 2 they are $DN2(J,K)$ and $DP2(J,K)$. Then the problem formulation for the first priority goal is

$$\text{MIN } \sum_J \sum_K \left[|DN1(J,K)| + |DP1(J,K)| \right]$$

subject to satisfying the goal

$$\sum_I [A(I,J,K) \times X(I,J,K)] + DN1(J,K) - DP1(J,K) = \text{Goal 1},$$

and satisfying the binding constraints

$$\sum_I [B(I,J,K) \times X(I,J,K)] = C(J,K),$$

for every regiment J and grade K .

Then the solution of the priority 2 goal is formulated for every regiment J and grade K as follows:

$$\text{Min } \sum_J \sum_K \left[|DN2(J,K)| + |DP2(J,K)| \right]$$

subject to satisfying the goal

$$\sum_I [A2(I,J,K) \times X(I,J,K)] + DN2(J,K) - DP2(J,K) = \text{Goal 2},$$

satisfying the binding constraints

$$\sum_I [B(I,J,K) \times X(I,J,K)] = C(J,K)$$

and, in addition, satisfying the previous priority

$$\sum_J \sum_K [|DN1(J,K)| + |DP1(J,K)|] = Z1,$$

where: Z1 = optimal value obtained in satisfying the first priority goal.

Similarly, the third priority is solved by

$$\text{Min} \sum_J \sum_K [|DN3(J,K)| + |DP3(J,K)|]$$

subject to

- (1) Satisfaction of the third goal,
- (2) Satisfaction of the binding constraints, and
- (3) Satisfaction of the additional constraints:

$$\sum_J \sum_K [|DN1(J,K)| + |DP1(J,K)|] = Z1$$

$$\sum_J \sum_K [|DN2(J,K)| + |DP2(J,K)|] = Z2$$

With one exception, all priorities are handled in a similar manner. The exception to this process is the geographic correctness goal which is explained below.

c. The geographic correctness goal states that as many positions as possible will be allocated in a "geographically correct" way. Profit coefficients are defined for every regiment and location combination with four as the highest profit and one the lowest. The geographic correctness achievement function is the only one that does not involve deviation variables. It is a maximization function of the form:

$$\text{Max} \quad \sum_I \sum_J \sum_K [P(I,J,K) \times X(I,J,K)]$$

where: $P(I,J,K)$ = profit coefficient

$X(I,J,K)$ = decision variable

C-3. CONSTRAINTS

a. There are two types of binding constraints in the model. The first consists of "availability" constraints, the second consists of "capacity" constraints. They require the model to do the following:

(1) **Availability Constraints.** Allocate all ERA positions.

(2) **Homebase Capacity Constraints.** Divide the ERA positions at a location among all rotational regiments homebased there to satisfy, as well as possible, flow requirements.

(3) **Non-homebase Capacity Constraints.** Allocate CONUS ERA positions to regiments to satisfy, as well as possible, each regiment's flow requirements. In the event there are insufficient CONUS ERA positions to satisfy the flow requirements, factor the flow requirements down to guarantee feasibility.

(4) **Overseas Capacity Constraints.** Allocate positions in overseas areas to regiments in that area to ensure that accompanied personnel with a 36-month OCONUS tour length requirement have a position for the nonunit portion of their tour. It is assumed that 60 percent of the personnel are accompanied; hence, 60 percent of the replacement strength in a long-tour area need a position to fill after 18 months. In many cases there are insufficient ERA positions to satisfy every regiment, so shortages are shared by all regiments rotating to the same overseas area.

b. Regimental flow requirements must be satisfied within the context of the capacity constraints applicable to each regiment.

APPENDIX D
REGIMENTAL STRUCTURES

D-1. INTRODUCTION. The purpose of this appendix is to provide a listing of the various regimental structures analyzed in the REPAST Study and to discuss the derivation of structures developed during the analysis. Each of the six distinct structures, identified as the Base Case and Alternatives 1 through 5, will be listed in separate tables. The three versions of Alternative 2 and two versions of Alternative 4 will be described in paragraphs D-4 and D-6, respectively. Units which have no rotating subordinate units are identified by footnotes. Unit designations used throughout the study were those effective on 30 September 1986 as extracted on 15 November 1983 from the then current PERSACS tape.

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D-2. BASE CASE

a. This regimental structure (Table D-1) was presented to the CSA for his approval. There are no regiments with both tank and cavalry units. The tank regiments are either balanced or CONUS heavy while the two armored cavalry regiments, 3/2d Cavalry, and 3/11th Cavalry, are each short two squadrons in CONUS. The CSA directed that tank units be considered to more evenly balance these cavalry regiments.

b. The 2-77 IN Battalion assigned to the 69th AR Regiment was originally a tank battalion. Upon its conversion to a high technology antitank unit, it was redesignated as shown.

Table D-1. Regimental Structure - Base Case

Regiment (homebase)	Unit (headquarters - location)	
	CONUS	OCONUS
66th Armor (FT Hood)	1-66 AR (2 AD-Hood) 3-66 AR (2 AD-Hood) ^a	2-66 AR (2 AD-FRG)
67th Armor (FT Hood)	1-67 AR (2 AD-Hood) 3-67 AR (2 AD-Hood)	2-32 AR (3 AD-FRG) 2-33 AR (3 AD-FRG)
37th Armor (FT Riley)	4-37 AR (1 ID-Riley) 3-37 AR (1 ID-Riley)	2-37 AR (1 ID-FRG) 1-37 AR (1 AD-FRG)
34th Armor (FT Riley)	1-34 AR (1 ID-Riley) 1-63 AR (1 ID-Riley)	3-34 AR (1 AD-FRG) 1-35 AR (1 AD-FRG)
8th Cavalry (FT Hood)	1-8 AR (1 CAV-Hood) 1-7 AR (1 CAV-Hood) ^a	1-33 AR (3 AD-FRG)
32d Armor (FT Hood)	2-5 AR (1 CAV-Hood) 2-8 AR (1 CAV-Hood)	1-32 AR (3 AD-FRG) 3-32 AR (3 AD-FRG)
68th Armor (FT Carson)	6-32 AR (4 ID-Carson) 3-10 AR (4 ID-Carson)	1-68 AR (9 ID-FRG) 2-68 AR (3 ID-FRG)
77th Armor (FT Carson)	2-34 AR (4 ID-Carson) 4-40 AR (4 ID-Carson) 1-77 AR (4 ID-Carson)	5-68 AR (3 ID-FRG) 3-68 AR (3 ID-FRG) 4-69 AR (3 ID-FRG)
70th Armor (FT Polk)	3-70 AR (5 ID-Polk) 1-40 AR (5 ID-Polk) 3-77 AR (5 ID-Polk) ^a	3-35 AR (1 AD-FRG) 1-13 AR (1 AD-FRG)
64th Armor (FT Stewart)	2-70 AR (24 ID-Stewart) 5-32 AR (24 ID-Stewart) 4-64 AR (24 ID-Stewart)	3-64 AR (3 ID-FRG) 2-64 AR (3 ID-FRG) 1-64 AR (3 ID-FRG)
73d Armor (FT Knox)	5-73 AR (194th-Knox) 4-68 AR (82d-Bragg) ^a 1-73 AR (NTC-Irwin) ^a	3-63 AR (3 ID-FRG) 2-72 AR (2 ID-KS) ^a
69th Armor (FT Knox)	5-33 AR (194th-Knox) 2-69 AR (197th-Benning) ^a 2-77 IN (9 ID-Lewis) ^a	3-69 AR (3 ID-FRG) 1-72 AR (2 ID-KS) ^a
1st Cavalry (FT Hood)	2-1 CAV (-)(2 AD-Hood) 1-9 CAV (-)(1 CAV-Hood)	C/2-1 CAV (2 AD-FRG) 3-12 CAV (3 AD-FRG)
7th Cavalry (FT Carson)	1-10 CAV (-)(4 ID-Carson) 2-9 CAV (-)(24 ID-Stewart) D/10 CAV (194th-Knox)	3-8 CAV (3 ID-FRG) 3-7 CAV (3 ID-FRG)
4th Cavalry (FT Riley)	4-12 CAV (-)(5 ID-Polk) 1-4 CAV (-)(1 ID-Riley) A/15 CAV (197th-Benning)	1-1 CAV (-)(1 AD-FRG) C/1-4 CAV (1 ID-FRG)
3/11th Cavalry (FT Bliss)	1-3 CAV (3 ACR-Bliss)	1-11 CAV (11 ACR-FRG) 2-11 CAV (11 ACR-FRG) ^a 3-11 CAV (11 ACR-FRG) ^a
3/2d Cavalry (FT Bliss)	2-3 CAV (3 ACR-Bliss)	1-2 CAV (2 ACR-FRG) 2-2 CAV (2 ACR-FRG) ^a 3-2 CAV (2 ACR-FRG) ^a

^aNonrotating units.

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D-3. ALTERNATIVE 1

a. This alternative (Table D-2) uses the CONUS armor battalions of the 8th CAV Regiment to provide better balance to the 3/2d and 3/11th CAV Regiments. This structure also balances the 66th AR Regiment.

b. The 8th CAV Regiment is "empty" only in the sense that it has no MOS 19E/K positions. Other CMF 19 positions are authorized.

Table D-2. Regimental Structure - Alternative 1

Regiment (homebase)	Unit (headquarters - location)	
	CONUS	OCONUS
66th Armor (FT Hood)	1-66 AR (2 AD-Hood) 3-66 AR (2 AD-Hood)	2-66 AR (2 AD-FRG) 1-33 AR (3 AD-FRG)
67th Armor (FT Hood)	1-67 AR (2 AD-Hood) 3-67 AR (2 AD-Hood)	2-32 AR (3 AD-FRG) 2-33 AR (3 AD-FRG)
37th Armor (FT Riley)	4-37 AR (1 ID-Riley) 3-37 AR (1 ID-Riley)	2-37 AR (1 ID-FRG) 1-37 AR (1 AD-FRG)
34th Armor (FT Riley)	1-34 AR (1 ID-Riley) 1-63 AR (1 ID-Riley)	3-34 AR (1 AD-FRG) 1-35 AR (1 AD-FRG)
8th Cavalry (FT Hood)		
32d Armor (FT Hood)	2-5 AR (1 CAV-Hood) 2-8 AR (1 CAV-Hood)	1-32 AR (3 AD-FRG) 3-32 AR (3 AD-FRG)
68th Armor (FT Carson)	6-32 AR (4 ID-Carson) 3-10 AR (4 ID-Carson)	1-68 AR (3 ID-FRG) 2-68 AR (3 ID-FRG)
77th Armor (FT Carson)	2-34 AR (4 ID-Carson) 4-40 AR (4 ID-Carson) 1-77 AR (4 ID-Carson)	5-68 AR (3 ID-FRG) 3-68 AR (3 ID-FRG) 4-69 AR (3 ID-FRG)
70th Armor (FT Polk)	3-70 AR (5 ID-Polk) 1-40 AR (5 ID-Polk) 3-77 AR (5 ID-Polk) ^a	3-35 AR (1 AD-FRG) 1-13 AR (1 AD-FRG)
64th Armor (FT Stewart)	2-70 AR (24 ID-Stewart) 5-32 AR (24 ID-Stewart) 4-64 AR (24 ID-Stewart)	3-64 AR (3 ID-FRG) 2-64 AR (3 ID-FRG) 1-64 AR (3 ID-FRG)
73d Armor (FT Knox)	5-73 AR (194th-Knox) 4-68 AR (82d-Bragg) ^a 1-73 AR (NTC-Irwin) ^a	3-63 AR (3 ID-FRG) 2-72 AR (2 ID-KS) ^a
69th Armor (FT Knox)	5-33 AR (194th-Knox) 2-69 AR (197th-Benning) ^a 2-77 IN (9 ID-Lewis) ^a	3-69 AR (3 ID-FRG) 1-72 AR (2 ID-KS) ^a
1st Cavalry (FT Hood)	2-1 CAV (-)(2 AD-Hood) 1-9 CAV (-)(1 CAV-Hood)	C/2-1 CAV (2 AD-FRG) 3-12 CAV (3 AD-FRG)
7th Cavalry (FT Carson)	1-10 CAV (-)(4 ID-Carson) 2-9 CAV (-)(24 ID-Stewart) D/10 CAV (194th-Knox)	3-8 CAV (3 ID-FRG) 3-7 CAV (3 ID-FRG)
4th Cavalry (FT Riley)	4-12 CAV (-)(5 ID-Polk) 1-4 CAV (-)(1 ID-Riley) A/15 CAV (197th-Benning)	1-1 CAV (-)(1 AD-FRG) C/1-4 CAV (1 ID-FRG)
3/11th Cavalry (FT Bliss)	1-3 CAV (3 ACR-Bliss) 1-8 AR (1 CAV-Hood) ^a	1-11 CAV (11 ACR-FRG) 2-11 CAV (11 ACR-FRG) ^a 3-11 CAV (11 ACR-FRG) ^a
3/2d Cavalry (FT Bliss)	2-3 CAV (3 ACR-Bliss) 1-7 AR (1 CAV-Hood) ^a	1-2 CAV (2 ACR-FRG) 2-2 CAV (2 ACR-FRG) ^a 3-2 CAV (2 ACR-FRG) ^a

^aNonrotating units.

D-4. ALTERNATIVE 2

a. This alternative (Table D-3) was developed from the Base Case structure.

b. Alternative 2A was developed:

- (1) To balance the 66th AR and 8th CAV Regiments.
- (2) To eliminate the two-theater deployment patterns of the 73d and 69th AR Regiments.
- (3) To provide better balance for the 3/11th and 3/2d CAV Regiments.

c. Alternatives 2B and 2C were developed:

- (1) To take advantage of the Alternative 2A structure, and
- (2) To provide better homebasing opportunities for the 3/11th and 3/2d CAV Regiments by taking advantage of the large number of ERA spaces available at FT Knox.

Table D-3. Regimental Structure - Alternative 2

Regiment (homebase)	Unit (headquarters - location)	
	CONUS	OCONUS
66th Armor (FT Hood)	1-66 AR (2 AD-Hood) 3-66 AR (2 AD-Hood)	2-66 AR (2 AD-FRG) 1-33 AR (3 AD-FRG)
67th Armor (FT Hood)	1-67 AR (2 AD-Hood) 3-67 AR (2 AD-Hood)	2-32 AR (3 AD-FRG) 2-33 AR (3 AD-FRG)
37th Armor (FT Riley)	4-37 AR (1 ID-Riley) 3-37 AR (1 ID-Riley)	2-37 AR (1 ID-FRG) 1-37 AR (1 AD-FRG)
34th Armor (FT Riley)	1-34 AR (1 ID-Riley) 1-63 AR (1 ID-Riley)	3-34 AR (1 AD-FRG) 1-35 AR (1 AD-FRG)
8th Cavalry (FT Hood)	1-8 AR (1 CAV-Hood) 1-7 AR (1 CAV-Hood)	3-69 AR (3 ID-FRG) 3-63 AR (3 ID-FRG)
32d Armor (FT Hood)	2-5 AR (1 CAV-Hood) 2-8 AR (1 CAV-Hood)	1-32 AR (3 AD-FRG) 3-32 AR (3 AD-FRG)
68th Armor (FT Carson)	6-32 AR (4 ID-Carson) 3-10 AR (4 ID-Carson)	1-68 AR (8 ID-FRG) 2-68 AR (8 ID-FRG)
77th Armor (FT Carson)	2-34 AR (4 ID-Carson) 4-40 AR (4 ID-Carson) 1-77 AR (4 ID-Carson)	5-68 AR (8 ID-FRG) 3-68 AR (8 ID-FRG) 4-69 AR (8 ID-FRG)
70th Armor (FT Polk)	3-70 AR (5 ID-Polk) 1-40 AR (5 ID-Polk) 3-77 AR (5 ID-Polk) ^a	3-35 AR (1 AD-FRG) 1-13 AR (1 AD-FRG)
64th Armor (FT Stewart)	2-70 AR (24 ID-Stewart) 5-32 AR (24 ID-Stewart) 4-64 AR (24 ID-Stewart)	3-64 AR (3 ID-FRG) 2-64 AR (3 ID-FRG) 1-64 AR (3 ID-FRG)
73d Armor (FT Bragg)	4-68 AR (82d-Bragg) ^a 1-73 AR (NTC-Irwin) ^a	2-72 AR (2 ID-KS) ^a
69th Armor (FT Benning)	2-69 AR (197th-Benning) ^a 2-77 IN (9 ID-Lewis) ^a	1-72 AR (2 ID-KS) ^a
1st Cavalry (FT Hood)	2-1 CAV (-)(2 AD-Hood) 1-9 CAV (-)(1 CAV-Hood)	C/2-1 CAV (2 AD-FRG) 3-12 CAV (3 AD-FRG)
7th Cavalry (FT Carson)	1-10 CAV (-)(4 ID-Carson) 2-9 CAV (-)(24 ID-Stewart) 0/10 CAV (194th-Knox)	3-8 CAV (8 ID-FRG) 3-7 CAV (3 ID-FRG)
4th Cavalry (FT Riley)	4-12 CAV (-)(5 ID-Polk) 1-4 CAV (-)(1 ID-Riley) A/15 CAV (197th-Benning)	1-1 CAV (-)(1 AD-FRG) C/1-4 CAV (1 ID-FRG)
3/11th Cavalry (FT Bliss) ^b	1-3 CAV (3 ACR-Bliss) 5-33 AR (194th-Knox) ^a	1-11 CAV (11 ACR-FRG) 2-11 CAV (11 ACR-FRG) ^a 3-11 CAV (11 ACR-FRG) ^a
3/2d Cavalry (FT Bliss) ^{b,c}	2-3 CAV (3 ACR-Bliss) 5-73 AR (194th-Knox) ^a	1-2 CAV (2 ACR-FRG) 2-2 CAV (2 ACR-FRG) ^a 3-2 CAV (2 ACR-FRG) ^a

^aNonrotating units.^bIn Alternative 2B these regiments are homebased at Fort Knox.^cIn Alternative 2C this regiment is homebased at Fort Knox.

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D-5. ALTERNATIVE 3

a. This alternative (Table D-4) was developed from the Alternative 2A structure.

b. It was developed:

(1) To take advantage of the Alternative 2A structure, and

(2) To provide better homebasing opportunities for the 73d AR Regiment at FT Knox.

Table D-4. Regimental Structure - Alternative 3

Regiment (homebase)	Unit (headquarters - location)	
	CONUS	OCONUS
66th Armor (FT Hood)	1-66 AR (2 AD-Hood) 3-66 AR (2 AD-Hood)	2-66 AR (2 AD-FRG) 1-33 AR (3 AD-FRG)
67th Armor (FT Hood)	1-67 AR (2 AD-Hood) 3-67 AR (2 AD-Hood)	2-32 AR (3 AD-FRG) 2-33 AR (3 AD-FRG)
37th Armor (FT Riley)	4-37 AR (1 ID-Riley) 3-37 AR (1 ID-Riley)	2-37 AR (1 ID-FRG) 1-37 AR (1 AD-FRG)
34th Armor (FT Riley)	1-34 AR (1 ID-Riley) 1-63 AR (1 ID-Riley)	3-34 AR (1 AD-FRG) 1-35 AR (1 AD-FRG)
8th Cavalry (FT Hood)	1-8 AR (1 CAV-Hood) 1-7 AR (1 CAV-Hood)	3-69 AR (3 ID-FRG) 3-63 AR (3 ID-FRG)
32d Armor (FT Hood)	2-5 AR (1 CAV-Hood) 2-8 AR (1 CAV-Hood)	1-32 AR (3 AD-FRG) 3-32 AR (3 AD-FRG)
68th Armor (FT Carson)	6-32 AR (4 ID-Carson) 3-10 AR (4 ID-Carson)	1-68 AR (3 ID-FRG) 2-68 AR (3 ID-FRG)
77th Armor (FT Carson)	2-34 AR (4 ID-Carson) 4-40 AR (4 ID-Carson) 1-77 AR (4 ID-Carson)	5-68 AR (3 ID-FRG) 3-68 AR (3 ID-FRG) 4-69 AR (3 ID-FRG)
70th Armor (FT Polk)	3-70 AR (5 ID-Polk) 1-40 AR (5 ID-Polk) 3-77 AR (5 ID-Polk) ^a	3-35 AR (1 AD-FRG) 1-13 AR (1 AD-FRG)
64th Armor (FT Stewart)	2-70 AR (24 ID-Stewart) 5-32 AR (24 ID-Stewart) 4-64 AR (24 ID-Stewart)	3-64 AR (3 ID-FRG) 2-64 AR (3 ID-FRG) 1-64 AR (3 ID-FRG)
73d Armor (FT Knox)	5-73 AR (194th-Knox) ^a 4-68 AR (82d-Bragg) ^a	2-72 AR (2 ID-KS) ^a
69th Armor (FT Benning)	2-69 AR (197th-Benning) ^a 2-77 IN (9 ID-Lewis) ^a	1-72 AR (2 ID-KS) ^a
1st Cavalry (FT Hood)	2-1 CAV (-)(2 AD-Hood) 1-9 CAV (-)(1 CAV-Hood)	C/2-1 CAV (2 AD-FRG) 3-12 CAV (3 AD-FRG)
7th Cavalry (FT Carson)	1-10 CAV (-)(4 ID-Carson) 2-9 CAV (-)(24 ID-Stewart) D/10 CAV (194th-Knox)	3-8 CAV (3 ID-FRG) 3-7 CAV (3 ID-FRG)
4th Cavalry (FT Riley)	4-12 CAV (-)(5 ID-Polk) 1-4 CAV (-)(1 ID-Riley) A/15 CAV (197th-Benning)	1-1 CAV (-)(1 AD-FRG) C/1-4 CAV (1 ID-FRG)
3/11th Cavalry (FT Bliss)	1-3 CAV (3 ACR-Bliss) 5-33 AR (194th-Knox) ^a	1-11 CAV (11 ACR-FRG) 2-11 CAV (11 ACR-FRG) ^a 3-11 CAV (11 ACR-FRG) ^a
3/2d Cavalry (FT Bliss)	2-3 CAV (3 ACR-Bliss) 1-73 AR (NTC-Irwin) ^a	1-2 CAV (2 ACR-FRG) 2-2 CAV (2 ACR-FRG) ^a 3-2 CAV (2 ACR-FRG) ^a

^aNonrotating units.

D-6. ALTERNATIVE 4

a. Alternatives 4A and 4B (Table D-5) were developed from Alternatives 2A and 2B, respectively.

b. They were developed:

(1) To take advantage of the Alternative 2 structures, and

(2) To better balance the 70th and 69th AR Regiments (the 2-77 IN of the 69th Regiment has no MOS 19E/K authorized spaces).

Table D-5. Regimental Structure - Alternative 4

Regiment (homebase)	Unit (headquarters - location)	
	CONUS	OCONUS
66th Armor (FT Hood)	1-66 AR (2 AD-Hood) 3-66 AR (2 AD-Hood)	2-66 AR (2 AD-FRG) 1-33 AR (3 AD-FRG)
67th Armor (FT Hood)	1-67 AR (2 AD-Hood) 3-67 AR (2 AD-Hood)	2-32 AR (3 AD-FRG) 2-33 AR (3 AD-FRG)
37th Armor (FT Riley)	4-37 AR (1 ID-Riley) 3-37 AR (1 ID-Riley)	2-37 AR (1 ID-FRG) 1-37 AR (1 AD-FRG)
34th Armor (FT Riley)	1-34 AR (1 ID-Riley) 1-63 AR (1 ID-Riley)	3-34 AR (1 AD-FRG) 1-35 AR (1 AD-FRG)
8th Cavalry (FT Hood)	1-8 AR (1 CAV-Hood) 1-7 AR (1 CAV-Hood)	3-69 AR (3 ID-FRG) 3-63 AR (3 ID-FRG)
32d Armor (FT Hood)	2-5 AR (1 CAV-Hood) 2-8 AR (1 CAV-Hood)	1-32 AR (3 AD-FRG) 3-32 AR (3 AD-FRG)
68th Armor (FT Carson)	6-32 AR (4 ID-Carson) 3-10 AR (4 ID-Carson)	1-68 AR (3 ID-FRG) 2-68 AR (3 ID-FRG)
77th Armor (FT Carson)	2-34 AR (4 ID-Carson) 4-40 AR (4 ID-Carson) 1-77 AR (4 ID-Carson)	5-68 AR (3 ID-FRG) 3-68 AR (3 ID-FRG) 4-69 AR (3 ID-FRG)
70th Armor (FT Polk)	3-70 AR (5 ID-Polk) 1-40 AR (5 ID-Polk)	3-35 AR (1 AD-FRG) 1-13 AR (1 AD-FRG)
64th Armor (FT Stewart)	2-70 AR (24 ID-Stewart) 5-32 AR (24 ID-Stewart) 4-64 AR (24 ID-Stewart)	3-64 AR (3 ID-FRG) 2-64 AR (3 ID-FRG) 1-64 AR (3 ID-FRG)
73d Armor (FT Bragg)	4-68 AR (82d-Bragg) ^a 1-73 AR (NTC-Irwin) ^a	2-72 AR (2 ID-KS) ^a
69th Armor (FT Benning)	2-69 AR (197th-Benning) ^a 2-77 IN (9 ID-Lewis) ^a 3-77 AR (5 ID-Polk) ^a	1-72 AR (2 ID-KS) ^a
1st Cavalry (FT Hood)	2-1 CAV (-)(2 AD-Hood) 1-9 CAV (-)(1 CAV-Hood)	C/2-1 CAV (2 AD-FRG) 3-12 CAV (3 AD-FRG)
7th Cavalry (FT Carson)	1-10 CAV (-)(4 ID-Carson) 2-9 CAV (-)(24 ID-Stewart) D/10 CAV (194th-Knox)	3-8 CAV (8 ID-FRG) 3-7 CAV (3 ID-FRG)
4th Cavalry (FT Riley)	4-12 CAV (-)(5 ID-Polk) 1-4 CAV (-)(1 ID-Riley) A/15 CAV (197th-Benning)	1-1 CAV (-)(1 AD-FRG) C/1-4 CAV (1 ID-FRG)
3/11th Cavalry (FT Bliss) ^b	1-3 CAV (3 ACR-Bliss) 5-33 AR (194th-Knox) ^a	1-11 CAV (11 ACR-FRG) 2-11 CAV (11 ACR-FRG) ^a 3-11 CAV (11 ACR-FRG) ^a
3/2d Cavalry (FT Bliss) ^b	2-3 CAV (3 ACR-Bliss) 5-73 AR (194th-Knox) ^a	1-2 CAV (2 ACR-FRG) 2-2 CAV (2 ACR-FRG) ^a 3-2 CAV (2 ACR-FRG) ^a

^aNonrotating units.^bIn Alternative 4B these regiments are homebased at FT Knox.

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D-7. ALTERNATIVE 5

a. This alternative (Table D-6) was developed from the Alternative 4B structure.

b. It was developed:

- (1) To take advantage of the Alternative 4B structure, and
- (2) To eliminate the cross-regimental assignment situation and to make possible the elimination of the subregimental affiliation situation discussed in Chapter 4.

Table D-6. Regimental Structure - Alternative 5

Regiment (homebase)	Unit (headquarters - location)	
	CONUS	OCONUS
66th Armor (FT Hood)	1-66 AR (2 AD-Hood) 3-66 AR (2 AD-Hood)	2-66 AR (2 AD-FRG) 1-33 AR (3 AD-FRG)
67th Armor (FT Hood)	1-67 AR (2 AD-Hood) 3-67 AR (2 AD-Hood)	2-32 AR (3 AD-FRG) 2-33 AR (3 AD-FRG)
37th Armor (FT Riley)	4-37 AR (1 ID-Riley) 3-37 AR (1 ID-Riley)	2-37 AR (1 ID-FRG) 1-37 AR (1 AD-FRG)
34th Armor (FT Riley)	1-34 AR (1 ID-Riley) 1-63 AR (1 ID-Riley)	3-34 AR (1 AD-FRG) 1-35 AR (1 AD-FRG)
8th Cavalry (FT Hood)	1-8 AR (1 CAV-Hood) 1-7 AR (1 CAV-Hood)	3-69 AR (3 ID-FRG) 3-63 AR (3 ID-FRG)
32d Armor (FT Hood)	2-5 AR (1 CAV-Hood) 2-8 AR (1 CAV-Hood)	1-32 AR (3 AD-FRG) 3-32 AR (3 AD-FRG)
68th Armor (FT Carson)	6-32 AR (4 ID-Carson) 3-10 AR (4 ID-Carson)	1-68 AR (3 ID-FRG) 2-68 AR (3 ID-FRG)
77th Armor (FT Carson)	2-34 AR (4 ID-Carson) 4-40 AR (4 ID-Carson) 1-77 AR (4 ID-Carson)	5-68 AR (3 ID-FRG) 3-68 AR (3 ID-FRG) 4-69 AR (3 ID-FRG)
70th Armor (FT Polk)	3-70 AR (5 ID-Polk) 1-40 AR (5 ID-Polk)	3-35 AR (1 AD-FRG) 1-13 AR (1 AD-FRG)
64th Armor (FT Stewart)	2-70 AR (24 ID-Stewart) 5-32 AR (24 ID-Stewart) 4-64 AR (24 ID-Stewart)	3-64 AR (3 ID-FRG) 2-64 AR (3 ID-FRG) 1-64 AR (3 ID-FRG)
73d Armor (FT Bragg)	4-68 AR (82d-Bragg) ^a 1-73 AR (NTC-Irwin) ^a	2-72 AR (2 ID-KS) ^a
69th Armor (FT Benning)	2-69 AR (197th-Benning) ^a 2-77 IN (9 ID-Lewis) ^a 3-77 AR (5 ID-Polk) ^a	1-72 AR (2 ID-KS) ^a
1st Cavalry (FT Hood)	2-1 CAV (-)(2 AD-Hood) 1-9 CAV (-)(1 CAV-Hood)	C/2-1 CAV (2 AD-FRG) 3-12 CAV (3 AD-FRG)
7th Cavalry (FT Carson)	1-10 CAV (-)(4 ID-Carson) 2-9 CAV (-)(24 ID-Stewart) 0/10 CAV (194th-Knox)	3-8 CAV (3 ID-FRG) 3-7 CAV (3 ID-FRG)
4th Cavalry (FT Riley)	4-12 CAV (-)(5 ID-Polk) 1-4 CAV (-)(1 ID-Riley) A/15 CAV (197th-Benning)	1-1 CAV (-)(1 AD-FRG) C/1-4 CAV (1 ID-FRG)
Corps Cavalry (FT Knox)	1-3 CAV (3 ACR-Bliss) 5-33 AR (194th-Knox) ^a 2-3 CAV (3 ACR-Bliss) 5-73 AR (194th-Knox) ^a	1-11 CAV (11 ACR-FRG) 2-11 CAV (11 ACR-FRG) ^a 3-11 CAV (11 ACR-FRG) ^a 1-2 CAV (2 ACR-FRG) 2-2 CAV (2 ACR-FRG) ^a 3-2 CAV (2 ACR-FRG) ^a

^aNonrotating units.

APPENDIX E
DETAILED REPORTS

Section I. GENERAL

E-1. INTRODUCTION. This appendix contains a sample of the allocation reports delivered to the sponsor. Section II reports the distribution of all (assigned and allocated) authorized positions by grade and regiment. Since the model distributed portions of positions in arriving at an optimal solution, fractions are presented to show the computational basis for the reports in Sections III and IV. Section III displays this same distribution as a percentage of the population at each location while Section IV displays it as a percentage of the total system population.

E-2. SUBHEADINGS. Selected report subheadings are defined as follows:

- a. **HOMEBASE:** the designated CONUS home station of the regiment.
- b. **ALTERNATE BASE:** all stations other than the homebase where assigned regimental units are based.
- c. **CONUS OTHER:** all CONUS stations other than the home and alternate bases.
- d. **ASSIGNED AREA 1:** an OCONUS area where assigned regimental units are posted.
- e. **ASSIGNED AREA 2:** a second OCONUS area where assigned regimental units are posted.
- f. **OTHER AREAS:** all OCONUS areas other than the assigned areas.

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Section II. BASIC DISTRIBUTION REPORTS

The tables in this section illustrate the reports which summarize the distribution of all (assigned and allocated) authorized positions for the given grade and MOS.

Table E-1. Distribution Summary, Grade E3, MOS 19E/K

REGIMENT	CONUS			OCONUS			TOTAL
	HOME- BASE	ALTERNATE BASE	CONUS OTHER	ASSIGNED AREA 1	ASSIGNED AREA 2	OTHER AREAS	
66TH AR	126.00	.00	10.14	126.00	.00	.00	262.14
67TH AR	126.00	.00	10.14	126.00	.00	.00	262.14
37TH AR	126.00	.00	10.14	126.00	.00	.00	262.14
34TH AR	126.00	.00	1.00	126.00	.00	.00	253.00
8TH CAV	126.00	.00	.17	126.00	.00	.00	252.17
320 AR	135.00	.00	1.14	126.00	.00	.00	262.14
68TH AR	126.00	.00	10.14	126.00	.00	.00	262.14
77TH AR	191.00	.00	13.21	189.00	.00	.00	393.21
71TH AR	126.00	.00	10.14	126.00	.00	.00	262.14
64TH AR	191.00	.00	13.21	189.00	.00	.00	393.21
730 AR	77.00	63.00	.00	60.80	.00	26.00	226.80
67TH AR	63.00	.00	63.00	66.20	.00	12.00	204.20
1ST CAV	.00	.00	.00	.00	.00	.00	.00
7TH CAV	24.00	14.90	.00	36.00	.00	.00	74.90
4TH CAV	.00	36.00	2.90	36.00	.00	.00	74.90
11TH CA	56.38	43.00	.00	129.00	.00	.00	268.38
20 CAV	96.38	43.00	.00	129.00	.00	.00	268.38

Table E-2. Distribution Summary, Grade E4, MOS 19E/K

REGIMENT	CONUS			OCONUS				TOTAL
	HOME-BASE	ALTERNATE BASE	CONUS OTHER	TOTAL CONUS	ASSIGNED AREA 1	ASSIGNED AREA 2	OTHER AREAS	
66TH AR	129.89	.00	.00	129.89	116.00	.00	8.35	254.24
67TH AR	129.89	.00	.00	129.89	124.35	.00	.00	254.24
37TH AR	116.00	.00	13.89	129.89	124.35	.00	.00	254.24
34TH AR	116.00	.00	9.36	125.36	120.02	.00	.00	245.38
8TH CAV	116.00	.00	8.95	124.95	119.62	.00	.00	244.57
320 AR	127.22	.00	2.67	129.89	124.35	.00	.00	254.24
68TH AR	116.00	.00	13.89	129.89	124.35	.00	.00	254.24
77TH AR	181.00	.00	13.84	194.84	174.00	.00	12.53	381.36
76TH AR	116.00	.00	13.89	129.89	123.83	.00	.52	254.24
64TH AR	180.00	.00	14.84	194.84	186.53	.00	.00	381.36
730 AR	58.00	58.00	.00	116.00	67.00	.00	10.55	193.55
69TH AR	58.00	.00	58.00	116.00	58.00	.00	24.05	198.05
1ST CAV	.00	.00	.00	.00	.00	.00	.00	.00
7TH CAV	24.00	15.92	.00	39.92	38.22	.00	.00	78.14
4TH CAV	.00	38.00	.00	38.00	36.38	.00	.00	74.38
11TH CA	93.88	44.00	.00	137.88	132.00	.00	.00	269.88
20 CAV	93.88	44.00	.00	137.88	132.00	.00	.00	269.88

Table E-3. Distribution Summary, Grade E5, MOS 19E/K

REGIMENT	CONUS				UCONUS				TOTAL
	HOME-BASE	ALTERNATE-BASE	CONUS-OTHER	TOTAL-CONUS	ASSIGNED-AREA-1	ASSIGNED-AREA-2	OTHER-AREAS	TOTAL-UCONUS	
66TH AR	121.48	.00	37.79	159.28	120.00	.00	7.18	127.18	286.45
67TH AR	121.48	.00	37.79	159.28	120.00	.00	.00	120.00	279.28
37TH AR	120.00	.00	39.28	159.28	121.00	.00	13.31	134.31	293.59
34TH AR	121.00	.00	38.59	159.59	122.00	.00	3.78	125.78	285.37
8TH CAV	121.48	.00	37.79	159.28	120.00	.00	5.98	125.98	285.26
32U AR	121.54	.00	37.73	159.28	120.00	.00	.00	120.00	279.28
68TH AR	122.36	.00	37.54	159.90	122.00	.00	7.73	129.73	289.64
77TH AR	183.55	.00	56.30	239.85	183.00	.00	.00	183.00	422.85
71TH AR	123.60	.00	36.30	159.90	122.00	.00	.00	122.00	281.90
64TH AR	188.00	.00	51.85	239.85	180.00	.00	.00	180.00	419.85
73U AR	51.00	65.00	21.16	137.16	61.00	.00	.00	61.00	198.16
69TH AR	61.02	.00	78.54	139.56	61.00	.00	.00	61.00	200.56
1ST CAV	.00	.00	.00	.00	.00	.00	.00	.00	.00
7TH CAV	24.09	26.30	.00	50.40	37.01	.00	5.50	42.51	92.90
4TH CAV	.00	38.38	12.02	50.40	36.99	.00	5.52	42.51	92.90
11TH CA	61.00	45.00	.00	106.00	135.00	.00	.00	135.00	241.00
20 CAV	61.00	45.00	.00	106.00	135.00	.00	.00	135.00	241.00

Table E-4. Distribution Summary, Grade E6, MOS 19E/K

REQUIREMENT	CONUS			OCOONUS			TOTAL
	HOME-BASE	ALTERNATE BASE	CONUS OTHER	TOTAL CONUS	ASSIGNED AREA 1	ASSIGNED AREA 2	
66TH AR	71.46	.00	53.04	124.51	73.90	.00	199.90
67TH AR	71.46	.00	53.04	124.51	73.90	.00	207.03
37TH AR	68.99	.00	55.52	124.51	73.90	.00	204.88
34TH AR	69.01	.00	55.50	124.51	74.50	.00	199.15
8TH CAV	71.46	.00	53.04	124.51	74.05	.00	202.84
32D AR	71.60	.00	52.90	124.51	73.90	.00	202.84
68TH AR	70.13	.00	54.38	124.51	73.90	.00	202.13
77TH AR	105.25	.00	81.52	186.76	110.86	.00	297.62
70TH AR	69.55	.00	54.96	124.51	73.90	.00	198.41
64TH AR	106.00	.00	80.76	186.76	110.86	.00	299.47
73D AR	36.00	39.00	29.29	104.29	34.00	.00	138.29
69TH AR	34.04	3.00	68.92	105.96	34.00	.00	139.96
1ST CAV	.00	.00	.00	.00	.00	.00	.00
7TH CAV	18.63	33.36	.00	51.99	31.16	.00	83.15
4TH CAV	.00	31.41	20.58	51.99	31.16	.00	83.15
11TH CA	34.00	24.00	.00	58.00	72.00	.00	130.00
2D CAV	39.18	24.00	.00	63.18	72.00	.00	135.18

Table E-5. Distribution Summary, Grade E7, MOS 19E/K

REGIMENT	CONUS			OCONUS				TOTAL
	HOME BASE	ALTERNATE BASE	CONUS OTHER	TOTAL CONUS	ASSIGNED AREA 1	ASSIGNED AREA 2	OTHER AREAS	
66TH AR	31.22	.00	33.26	64.48	32.30	.00	.00	96.77
67TH AR	31.22	.00	33.26	64.48	32.30	.00	2.00	98.77
37TH AR	28.49	.00	35.98	64.48	32.84	.00	.43	97.75
34TH AR	28.50	.00	35.97	64.48	32.30	.00	.00	96.77
8TH CAV	31.22	.00	33.26	64.48	32.30	.00	.00	96.77
32L AR	31.35	.00	33.13	64.48	32.30	.00	.00	96.77
64TH AR	28.36	.00	36.12	64.48	32.30	.00	2.44	99.21
77TH AR	42.55	.00	54.17	96.72	48.45	.00	.00	145.16
70TH AR	30.36	.00	34.12	64.48	32.30	.00	.00	96.77
64TH AR	45.00	.00	51.72	96.72	48.45	.00	.00	145.16
73L AR	1.00	18.00	36.17	55.17	14.00	.00	.00	69.17
69TH AR	14.02	1.00	41.86	56.88	14.00	.00	.00	70.88
1ST CAV	.00	.00	.00	.00	.00	.00	.00	.00
7TH CAV	6.10	17.88	.00	23.98	12.10	.00	1.07	37.14
4TH CAV	.00	11.62	12.36	23.98	12.10	.00	1.07	37.14
11TH CA	20.93	9.99	.00	30.92	27.00	.00	.00	57.92
21 CAV	15.82	9.99	.00	25.81	27.00	.00	.00	52.81

Section III. DISTRIBUTION AS A PERCENTAGE OF THE LOCAL POPULATION

The tables in this section illustrate the reports which express the Section II distributions by percentage of the population at each location.

Table E-6. Distribution Summary by Location Percentage, Grade E3, MOS 19E/K

REQUIREMENT	CONUS			OCONUS				TOTAL	
	HOME-BASE	ALTERNATE BASE	CONUS OTHER	TOTAL CONUS	ASSIGNED AREA 1	ASSIGNED AREA 2	OTHER AREAS		
66TH AR	24.56	.00	.64	6.48	7.25	.00	.00	6.70	6.58
67TH AR	24.56	.00	.64	6.48	7.25	.00	.00	6.70	6.58
37TH AR	50.00	.00	.55	6.48	7.25	.00	.00	6.70	6.58
34TH AR	50.00	.00	.05	6.04	7.25	.00	.00	6.70	6.35
8TH CAV	24.56	.00	.01	6.01	7.25	.00	.00	6.70	6.33
32D AR	26.32	.00	.07	6.48	7.25	.00	.00	6.70	6.58
68TH AR	36.95	.00	.58	6.48	7.25	.00	.00	6.70	6.58
77TH AR	56.01	.00	.75	9.72	10.88	.00	.00	10.05	9.87
70TH AR	59.15	.00	.54	6.48	7.25	.00	.00	6.70	6.58
64TH AR	100.00	.00	.69	9.72	10.88	.00	.00	10.05	9.87
73D AR	100.00	24.61	.00	6.66	47.87	.00	.39	4.61	5.70
69TH AR	84.00	.00	3.11	6.00	52.13	.00	.18	4.16	5.13
151 CAV	.00	.00	.00	.00	.00	.00	.00	.00	.00
77TH CAV	7.04	1.60	.00	1.85	2.07	.00	.00	1.91	1.88
4TH CAV	.00	6.25	.16	1.85	2.07	.00	.00	1.91	1.88
11TH CA	34.92	12.50	.00	6.63	7.43	.00	.00	6.86	6.74
2D CAV	34.92	12.50	.00	6.63	7.43	.00	.00	6.86	6.74

Table E-7. Distribution Summary by Location Percentage,
Grade E4, MOS 19E/K

REGIMENT	CONUS				OCONUS				TOTAL
	HOME-BASE	ALTERNATE BASE	CONUS OTHER	TOTAL CONUS	ASSIGNED AREA 1	ASSIGNED AREA 2	OTHER AREAS	TOTAL OCONUS	
66TH AR	25.82	.00	.00	6.48	6.92	.00	1.33	6.70	6.58
67TH AR	25.82	.00	.00	6.48	7.42	.00	.00	6.70	6.58
37TH AR	50.00	.00	.78	6.48	7.42	.00	.00	6.70	6.58
34TH AR	50.00	.00	.53	6.25	7.16	.00	.00	6.46	6.35
8TH CAV	23.06	.00	.60	6.23	7.14	.00	.00	6.44	6.33
320 AR	25.29	.00	.18	6.48	7.42	.00	.00	6.70	6.58
66TH AR	36.14	.00	.82	6.48	7.42	.00	.00	6.70	6.58
77TH AR	56.39	.00	.82	9.72	10.38	.00	1.99	10.04	9.87
77TH AR	58.59	.00	.77	6.48	7.39	.00	.08	6.70	6.58
64TH AR	100.00	.00	.81	9.72	11.13	.00	.00	10.04	9.87
730 AR	100.00	24.58	.00	5.79	53.60	.00	.16	4.18	5.01
69TH AR	80.56	.00	3.00	5.79	46.40	.00	.36	4.42	5.13
151 CAV	.00	.00	.00	.00	.00	.00	.00	.00	.00
77TH CAV	7.48	1.83	.00	1.99	2.28	.00	.00	2.06	2.02
4TH CAV	.00	7.04	.00	1.90	2.17	.00	.00	1.96	1.93
21TH CA	36.67	12.50	.00	6.88	7.88	.00	.00	7.11	6.99
20 CAV	36.67	12.50	.00	6.88	7.88	.00	.00	7.11	6.99

Table E-8. Distribution Summary by Location Percentage,
Grade E5, MOS 19E/K

REGIMENT	CONUS				OCOONUS				TOTAL
	HOME-BASE	ALTERNATE-BASE	CONUS-OTHER	TOTAL CONUS	ASSIGNED AREA 1	ASSIGNED AREA 2	OTHER AREAS	TOTAL OCONUS	
66TH AR	25.00	.00	2.03	6.79	7.17	.00	1.14	6.89	6.84
67TH AR	25.00	.00	2.03	6.79	7.17	.00	.00	6.50	6.67
37TH AR	49.79	.00	1.87	6.79	7.23	.00	2.11	7.28	7.01
34TH AR	50.21	.00	1.83	6.81	7.29	.00	.60	6.82	6.81
8TH CAV	25.00	.00	2.03	6.79	7.17	.00	.95	6.83	6.81
32U AR	25.01	.00	2.03	6.79	7.17	.00	.00	6.50	6.67
69TH AR	37.08	.00	1.86	6.82	7.29	.00	1.23	7.03	6.91
77TH AR	55.62	.00	2.79	10.23	10.93	.00	.00	9.92	10.09
70TH AR	59.14	.00	1.70	6.82	7.29	.00	.00	6.61	6.73
64TH AR	100.00	.00	2.40	10.23	10.75	.00	.00	9.76	10.02
73U AR	100.00	25.00	.95	5.85	45.86	.00	.00	3.31	4.73
69TH AH	81.36	.00	3.46	5.95	45.86	.00	.00	3.31	4.79
1ST CAV	.00	.00	.00	.00	.00	.00	.00	.00	.00
7TH CAV	7.30	3.02	.00	2.15	2.21	.00	.87	2.30	2.22
4TH CAV	.00	6.76	.59	2.15	2.21	.00	.88	2.30	2.22
11TH CA	24.60	12.50	.00	4.52	8.06	.00	.00	7.32	5.75
2U CAV	24.60	12.50	.00	4.52	8.06	.00	.00	7.32	5.75

Table E-9. Distribution Summary by Location Percentage,
Grade E6, MOS 19E/K

REGIMENT	CONUS			OCONUS				TOTAL
	HOME BASE	ALTERNATE BASE	CONUS OTHER	TOTAL CONUS	ASSIGNED AREA 1	ASSIGNED AREA 2	OTHER AREAS	
66TH AR	24.99	.00	3.49	6.90	7.25	.00	.24	6.84
67TH AR	24.99	.00	3.49	6.90	7.25	.00	1.37	7.08
37TH AR	49.99	.00	3.33	6.90	7.25	.00	1.03	7.01
34TH AR	50.01	.00	3.33	6.90	7.30	.00	.02	6.81
8TH CAV	24.99	.00	3.49	6.90	7.26	.00	.68	6.94
32D AR	25.04	.00	3.48	6.90	7.25	.00	.70	6.94
66TH AR	36.15	.00	3.38	6.90	7.25	.00	.59	6.91
77TH AR	54.25	.00	5.06	10.35	10.87	.00	.00	10.18
70TH AR	57.01	.00	3.27	6.90	7.25	.00	.00	6.79
64TH AR	100.00	.00	4.75	10.35	10.87	.00	.29	10.24
73D AP	100.00	25.00	1.69	5.78	45.95	.00	.00	4.73
69TH AR	72.43	25.00	3.93	5.87	45.95	.00	.00	4.79
1ST CAV	.00	.00	.00	.00	.00	.00	.00	.00
7TH CAV	9.60	1.95	.00	2.88	3.06	.00	.00	2.84
4TH CAV	.00	9.29	1.27	2.88	3.06	.00	.00	2.84
11TH CA	4.53	11.32	.00	3.21	7.06	.00	.00	4.45
2D CAV	5.27	11.32	.00	3.50	7.06	.00	.00	4.62

Table E-10. Distribution Summary by Location Percentage,
Grade E7, MOS 19E/K

REGIMENT	CONUS			OCONUS				TOTAL
	HOME - BASE	ALTERNATE BASE	CONUS OTHER	TOTAL CONUS	ASSIGNED AREA 1	ASSIGNED AREA 2	OTHER AREAS	
66TH AR	24.97	.00	4.15	6.96	7.44	.00	.00	6.94
67TH AR	24.97	.00	4.15	6.96	7.44	.00	.32	7.08
37TH AR	49.99	.00	4.14	6.96	7.57	.00	.07	7.01
34TH AR	50.01	.00	4.14	6.96	7.44	.00	.00	6.94
8TH CAV	24.97	.00	4.15	6.96	7.44	.00	.00	6.94
32D AR	25.08	.00	4.14	6.96	7.44	.00	.00	6.94
68TH AR	36.83	.00	4.25	6.96	7.44	.00	.39	7.11
77TH AR	55.25	.00	6.38	10.44	11.16	.00	.00	10.41
71TH AR	59.53	.00	3.90	6.96	7.44	.00	.00	6.94
69TH AR	100.00	.00	5.87	10.44	11.16	.00	.00	10.41
70 AR	100.00	25.00	3.99	5.96	50.00	.00	.00	4.96
69TH AR	73.79	25.00	4.62	6.14	50.00	.00	.00	5.08
1ST CAV	.00	.00	.00	.00	.00	.00	.00	.00
7TH CAV	7.92	1.93	.00	2.59	2.79	.00	.17	2.66
4TH CAV	.00	6.30	1.45	2.59	2.79	.00	.17	2.66
11TH CA	5.01	12.49	.00	3.34	6.22	.00	.00	4.15
2D CAV	3.79	12.49	.00	2.79	6.22	.00	.00	3.79

CAA-SR-84-8

Section IV. DISTRIBUTION AS A PERCENTAGE OF THE TOTAL POPULATION

The tables in this section illustrate the reports which express the Section II distributions by percentage of the total population.

Table E-11. Distribution Summary by System Percentage,
Grade E3, MOS 19E/K

REGIMENT	CONUS			OCONUS				TOTAL
	HOME - BASE	ALTERNATE BASE	CONUS OTHER	TOTAL CONUS	ASSIGNED AREA 1	ASSIGNED AREA 2	OTHER AREAS	TOTAL OCONUS
66TH AR	3.16	.00	.25	3.42	3.16	.00	.00	3.16
67TH AR	3.16	.00	.25	3.42	3.16	.00	.00	3.16
37TH AR	3.16	.00	.25	3.42	3.16	.00	.00	3.16
38TH AR	3.16	.00	.03	3.19	3.16	.00	.00	3.16
8TH CAV	3.16	.00	.00	3.17	3.16	.00	.00	3.16
32D AR	3.39	.00	.03	3.42	3.16	.00	.00	3.16
68TH AR	3.16	.00	.25	3.42	3.16	.00	.00	3.16
77TH AR	4.80	.00	.33	5.13	4.75	.00	.00	4.75
70TH AR	3.16	.00	.25	3.42	3.16	.00	.00	3.16
64TH AR	4.80	.00	.33	5.13	4.75	.00	.00	4.75
73D AR	1.93	1.58	.00	3.52	1.53	.00	.65	2.18
69TH AR	1.58	.00	1.58	3.16	1.66	.00	.30	1.96
1ST CAV	.00	.00	.00	.00	.00	.00	.00	.00
7TH CAV	.60	.37	.00	.98	.90	.00	.00	.90
4TH CAV	.00	.90	.07	.98	.90	.00	.00	.90
11TH CA	2.42	1.08	.00	3.50	3.24	.00	.00	3.24
2D CAV	2.42	1.08	.00	3.50	3.24	.00	.00	3.24

Table E-12. Distribution Summary by System Percentage,
Grade E4, MOS 19E/K

REGIMENT	CONUS				OCONUS				TOTAL
	HOME BASE	ALTERNATE BASE	CONUS OTHER	TOTAL CONUS	ASSIGNED AREA 1	ASSIGNED AREA 2	OTHER AREAS	TOTAL OCONUS	
66TH AR	3.36	.00	.00	3.36	3.00	.00	.22	3.22	6.58
67TH AR	3.36	.00	.00	3.36	3.22	.00	.00	3.22	6.58
37TH AR	3.00	.00	.36	3.36	3.22	.00	.00	3.22	6.58
34TH AR	3.00	.00	.24	3.25	3.11	.00	.00	3.11	6.35
8TH CAV	3.00	.00	.23	3.24	3.10	.00	.00	3.10	6.33
320 AR	3.29	.00	.07	3.36	3.22	.00	.00	3.22	6.58
68TH AR	3.00	.00	.36	3.36	3.22	.00	.00	3.22	6.58
77TH AR	4.69	.00	.36	5.04	4.51	.00	.32	4.83	9.87
7JTH AR	3.00	.00	.36	3.36	3.71	.00	.01	3.72	6.58
64TH AR	4.66	.00	.38	5.04	4.83	.00	.00	4.83	9.87
730 AR	1.50	1.50	.00	3.00	1.73	.00	.27	2.01	5.01
69TH AR	1.50	.00	1.50	3.00	1.50	.00	.62	2.12	5.13
1ST CAV	.00	.00	.00	.00	.00	.00	.00	.00	.00
7TH CAV	.62	.41	.00	1.03	.99	.00	.00	.99	2.02
4TH CAV	.00	.98	.00	.98	.94	.00	.00	.94	1.93
11TH CA	2.43	1.14	.00	3.57	3.42	.00	.00	3.42	6.99
20 CAV	2.43	1.14	.00	3.57	3.42	.00	.00	3.42	6.99

REQUIREMENT	CONUS			OCONUS			TOTAL		
	HOME-BASE	ALTERNATE-BASE	CONUS-OTHER	TOTAL-CONUS	ASSIGNED-AREA-1	ASSIGNED-AREA-2		OTHER-AREAS	TOTAL-OCONUS
66TH AR	2.90	.00	.90	3.80	2.86	.00	.17	3.04	6.84
67TH AR	2.90	.00	.90	3.80	2.86	.00	.00	2.86	6.67
37TH AR	2.86	.00	.94	3.80	2.89	.00	.32	3.21	7.01
34TH AR	2.89	.00	.92	3.81	2.91	.00	.09	3.00	6.81
81TH CAV	2.90	.00	.90	3.80	2.86	.00	.14	3.01	6.81
320 AR	2.90	.00	.90	3.80	2.86	.00	.00	2.86	6.67
66TH AR	2.92	.00	.90	3.82	2.91	.00	.18	3.10	6.91
77TH AR	4.38	.00	1.34	5.72	4.37	.00	.00	4.37	10.09
76TH AR	2.95	.00	.87	3.82	2.91	.00	.00	2.91	6.73
64TH AR	4.49	.00	1.24	5.72	4.30	.00	.00	4.30	10.02
1730 AR	1.22	1.55	.51	3.27	1.46	.00	.00	1.46	4.73
69TH AR	1.46	.00	1.87	3.33	1.46	.00	.00	1.46	4.79
153 CAV	.00	.00	.00	.00	.00	.00	.00	.00	.00
7TH CAV	.57	.63	.00	1.20	.98	.00	.13	1.01	2.22
4TH CAV	.00	.92	.29	1.20	.88	.00	.13	1.01	2.22
11TH CA	1.46	1.07	.00	2.53	3.22	.00	.00	3.22	5.75
20 CAV	1.46	1.07	.00	2.53	3.22	.00	.00	3.22	5.75

Table E-14. Distribution Summary by System Percentage,
Grade E6, MOS 19E/K

REGIMENT	CONUS				OCNUS			
	HOME- BASE	ALTERNATE BASE	CONUS OTHER	TOTAL CONUS	ASSIGNED AREA 1	ASSIGNED AREA 2	OTHER AREAS	TOTAL OCNUS
06TH AR	2.44	.60	1.81	4.26	2.53	.20	.05	2.58
67TH AR	2.44	.60	1.81	4.26	2.53	.00	.29	2.82
37TH AR	2.36	.00	1.90	4.26	2.53	.00	.22	2.75
34TH AR	2.36	.00	1.90	4.26	2.55	.00	.00	2.55
8TH CAV	2.44	.60	1.81	4.26	2.53	.00	.15	2.68
32D AR	2.45	.00	1.81	4.26	2.53	.00	.15	2.68
64TH AR	2.40	.60	1.86	4.26	2.53	.00	.13	2.65
77TH AR	3.60	.00	2.79	6.39	3.79	.00	.00	3.79
77TH AR	2.36	.00	1.88	4.26	2.53	.00	.00	2.53
64TH AR	3.63	.00	2.76	6.39	3.79	.00	.06	3.85
73D AR	1.23	1.33	1.70	3.57	1.16	.00	.00	1.16
65TH AR	1.16	.10	2.36	3.62	1.16	.00	.00	1.16
1ST CAV	.60	.60	.00	.00	.00	.00	.00	.00
7TH CAV	.64	1.14	.00	1.78	1.07	.00	.00	1.07
4TH CAV	.60	1.07	.70	1.78	1.07	.00	.00	1.07
11TH CA	1.16	.82	.00	1.98	2.46	.00	.00	2.46
211 CAV	1.34	.82	.00	2.16	2.46	.00	.00	2.46
								6.84
								7.08
								7.01
								6.91
								6.94
								6.94
								6.91
								10.18
								6.79
								10.24
								4.73
								4.79
								.00
								2.84
								2.84
								4.45
								4.62

Table E-15. Distribution Summary by System Percentage,
Grade E7, MOS 19E/K

REGIMENT	CONUS			OCONUS				TOTAL
	HOME- BASE	ALTERNATE BASE	CONUS OTHER	TOTAL CONUS	ASSIGNED AREA 1	ASSIGNED AREA 2	OTHER AREAS	
66TH AR	2.24	.00	2.38	4.62	2.32	.00	.00	6.94
67TH AR	2.24	.00	2.38	4.62	2.32	.00	.14	7.08
37TH AR	2.04	.00	2.58	4.62	2.35	.00	.03	7.01
34TH AR	2.04	.00	2.58	4.62	2.32	.00	.00	6.94
8TH CAV	2.24	.00	2.38	4.62	2.32	.00	.00	6.94
32U AR	2.25	.00	2.37	4.62	2.32	.00	.00	6.94
68TH AR	2.03	.00	2.59	4.62	2.32	.00	.17	7.11
77TH AR	3.05	.00	3.88	6.93	3.47	.00	.00	10.41
70TH AR	2.18	.00	2.45	4.62	2.32	.00	.00	6.94
64TH AR	3.23	.00	3.71	6.93	3.47	.00	.00	10.41
73U AR	.07	1.29	2.59	3.96	1.00	.00	.00	4.96
69TH AR	1.01	.07	3.00	4.08	1.00	.00	.00	5.08
15T CAV	.00	.00	.00	.00	.00	.00	.00	.00
7TH CAV	.44	1.28	.00	1.72	.87	.00	.08	2.66
4TH CAV	.00	.63	.89	1.72	.87	.00	.08	2.66
11TH CA	1.50	.72	.00	2.22	1.94	.00	.00	4.15
20 CAV	1.13	.72	.00	1.85	1.94	.00	.00	3.79

APPENDIX F
SPONSOR'S COMMENTS



DEPARTMENT OF THE ARMY
OFFICE OF THE DEPUTY CHIEF OF STAFF FOR OPERATIONS AND PLANS
WASHINGTON, DC 20310

REPLY TO
ATTENTION OF

DAMO-ODO

19 March 1984

SUBJECT: US Army Regimental Personnel Allocation Study (REPAST)

Director
US Army Concepts Analysis Agency
Department of the Army
ATTN: CSCA-FSP
8120 Woodmont
Bethesda, Maryland 20814

1. Reference letter, CSCA-FSP, VSCAA, SAB, 27 Feb 84.
2. Concur with the draft study report. Attached is the Study Critique Sheet.

1 Incl
as

M. J. Lally, Jr.
M. J. LALLY, JR.
Colonel, GS
Chief, Operations and
Contingency Plans Division

CAA-SR-84-8

(NOT USED)

STUDY CRITIQUE

(This document may be modified to add more space for responses to questions.)

1. Were there any editorial comments? None. If so, please list on separate page and attach to the critique sheet.

2. Was the work accomplished in a timely manner? Yes. If not, please comment. _____

3. Does the work report address adequately the issues planned for the analysis? Yes. If not, please comment. _____

4. Were appropriate analysis techniques used? Yes. If not, please comment. _____

5. Are the findings fully supported by good analysis based on sound assumptions? Yes. If not, please explain. _____

6. Does the report contain the preferred level of details of the analysis? Yes. If not, please comment. _____

7. Is the written material fully satisfactory in terms of clarity of presentation, completeness, and style? Yes. If not, please comment. _____

Inclosure

STUDY CRITIQUE (CONTINUED)

8. Are all Figures and Tables clear and helpful to the reader? Yes.
If not, please comment. _____

9. Does the report satisfy fully the expectations that were present when
the work was directed? Yes. If not, please explain how not.

10. Will the Findings in this report be helpful to the organization which
directed that the work be done? Yes. If so, please indicate
how, and if not, please explain why not. _____

11. Judged overall, how do you rate the study? (circle one)

Poor Fair Average Good Excellent

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US ARMY REGIMENTAL
PERSONNEL ALLOCATION STUDY
(REPAST)

ONE SHEET
STUDY GIST
CAA-SR-84-8

THE PRINCIPAL FINDINGS of the work reported herein are as follows:

- (1) The proposed armor regimental structure which provides the best balance between CONUS and OCONUS elements of each regiment also provides the most equal career opportunities for MOS 19E and 19K.
- (2) Unit flow requirements constrain so many of the MOS 19E and 19K extraregimental positions that only limited equalization of career opportunities in disadvantaged regiments is possible.
- (3) Affiliating component units of a regiment with other regiments alters the career opportunities of soldiers serving in the regiment from the opportunities afforded to individuals in a similar undivided regiment.
- (4) If MOS 19E and 19K are not considered compatible and substitutable, the maximum number of companies which may cycle overseas is reduced from 176 to 136.

THE MAIN ASSUMPTIONS on which the work reported herein rests are as follows:

- (1) The authorization data provided by the proponent is accurate. The Army will be manned to that authorization.
- (2) The system is operating in a steady-state peacetime condition and will not be subject to major dislocations such as restationing of units and unit activations, deactivations, and conversions.
- (3) MOS 19E and 19K are compatible and substitutable.
- (4) Equal time in CONUS between overseas tours, equal promotion opportunity, and the best possible assignment locations are the most important individual career characteristics in that order.

THE PRINCIPAL LIMITATIONS of this work which may affect the findings are as follows:

- (1) The study did not address questions concerning the effect of the regimental and unit replacement system on the cohesion, readiness, or capability of the units involved.

(2) Only MOS 19E and 19K were considered; questions concerning other combat, combat support, and combat service support personnel were not addressed.

(3) The methodology employed was deterministic and ignored many manning functions and interactions. For example, transitions between primary and secondary MOSs were not considered.

THE SCOPE OF THE STUDY is an analysis of selected individual career characteristics that would result for soldiers serving in any of the proposed tank or cavalry regiments. All armor regiments are included in the analysis because CMF 19 spaces are authorized in tank as well as cavalry units.

THE STUDY OBJECTIVES were to:

(1) Analyze various alternatives for cavalry regiments to determine the proposal which minimizes the deviation between regiments in turnaround time, promotion opportunity, and geographic location.

(2) Determine the allocation of CMF 19 (MOSs 19E and 19K) spaces for each cavalry regiment by grade and MOS.

THE BASIC APPROACH followed in this study was to distribute extraregimental personnel spaces to proposed regiments to minimize the deviation between regiments in turnaround time, promotion opportunity, and location. A sequential linear goal programming model was used for this effort. The achievement function values obtained for each set of regimental proposals were then compared to determine the best proposal.

THE REASON FOR PERFORMING THE STUDY was to assist the Office of the Deputy Chief of Staff for Operations and Plans in the development and implementation of a regimental system for cavalry units.

THE STUDY SPONSOR was the Office of the Deputy Chief of Staff for Operations and Plans (ODCSOPS).

THE STUDY EFFORT was directed by MAJ William L. Carr, Force Systems Directorate.

COMMENTS AND QUESTIONS may be directed to the US Army Concepts Analysis Agency, ATTN: Assistant Director for Force Systems (CSCA-FS), 8120 Woodmont Avenue, Bethesda, MD 20814.

US ARMY REGIMENTAL PERSONNEL ALLOCATION STUDY (REPAST)
(U) ARMY CONCEPTS ANALYSIS AGENCY BETHESDA MD W L CARR
FEB 84 CAA-SR-84-8

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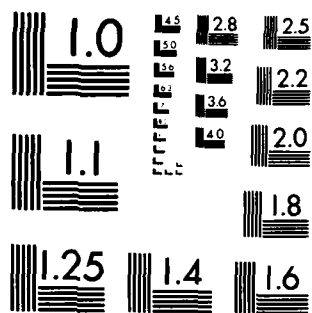
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US ARMY REGIMENTAL
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(REPAST)

ONE SHEET
STUDY GIST
CAA-SR-84-8

THE PRINCIPAL FINDINGS of the work reported herein are as follows:

- (1) The proposed armor regimental structure which provides the best balance between CONUS and OCONUS elements of each regiment also provides the most equal career opportunities for MOS 19E and 19K.
- (2) Unit flow requirements constrain so many of the MOS 19E and 19K extraregimental positions that only limited equalization of career opportunities in disadvantaged regiments is possible.
- (3) Affiliating component units of a regiment with other regiments alters the career opportunities of soldiers serving in the regiment from the opportunities afforded to individuals in a similar undivided regiment.
- (4) If MOS 19E and 19K are not considered compatible and substitutable, the maximum number of companies which may cycle overseas is reduced from 176 to 136.

THE MAIN ASSUMPTIONS on which the work reported herein rests are as follows:

- (1) The authorization data provided by the proponent is accurate. The Army will be manned to that authorization.
- (2) The system is operating in a steady-state peacetime condition and will not be subject to major dislocations such as restationing of units and unit activations, deactivations, and conversions.
- (3) MOS 19E and 19K are compatible and substitutable.
- (4) Equal time in CONUS between overseas tours, equal promotion opportunity, and the best possible assignment locations are the most important individual career characteristics in that order.

THE PRINCIPAL LIMITATIONS of this work which may affect the findings are as follows:

- (1) The study did not address questions concerning the effect of the regimental and unit replacement system on the cohesion, readiness, or capability of the units involved.

(2) Only MOS 19E and 19K were considered; questions concerning other combat, combat support, and combat service support personnel were not addressed.

(3) The methodology employed was deterministic and ignored many manning functions and interactions. For example, transitions between primary and secondary MOSs were not considered.

THE SCOPE OF THE STUDY is an analysis of selected individual career characteristics that would result for soldiers serving in any of the proposed tank or cavalry regiments. All armor regiments are included in the analysis because CMF 19 spaces are authorized in tank as well as cavalry units.

THE STUDY OBJECTIVES were to:

(1) Analyze various alternatives for cavalry regiments to determine the proposal which minimizes the deviation between regiments in turnaround time, promotion opportunity, and geographic location.

(2) Determine the allocation of CMF 19 (MOSs 19E and 19K) spaces for each cavalry regiment by grade and MOS.

THE BASIC APPROACH followed in this study was to distribute extraregimental personnel spaces to proposed regiments to minimize the deviation between regiments in turnaround time, promotion opportunity, and location. A sequential linear goal programming model was used for this effort. The achievement function values obtained for each set of regimental proposals were then compared to determine the best proposal.

THE REASON FOR PERFORMING THE STUDY was to assist the Office of the Deputy Chief of Staff for Operations and Plans in the development and implementation of a regimental system for cavalry units.

THE STUDY SPONSOR was the Office of the Deputy Chief of Staff for Operations and Plans (ODCSOPS).

THE STUDY EFFORT was directed by MAJ William L. Carr, Force Systems Directorate.

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